

FEBRUARY, 1941

ELECTRICAL SOUTH

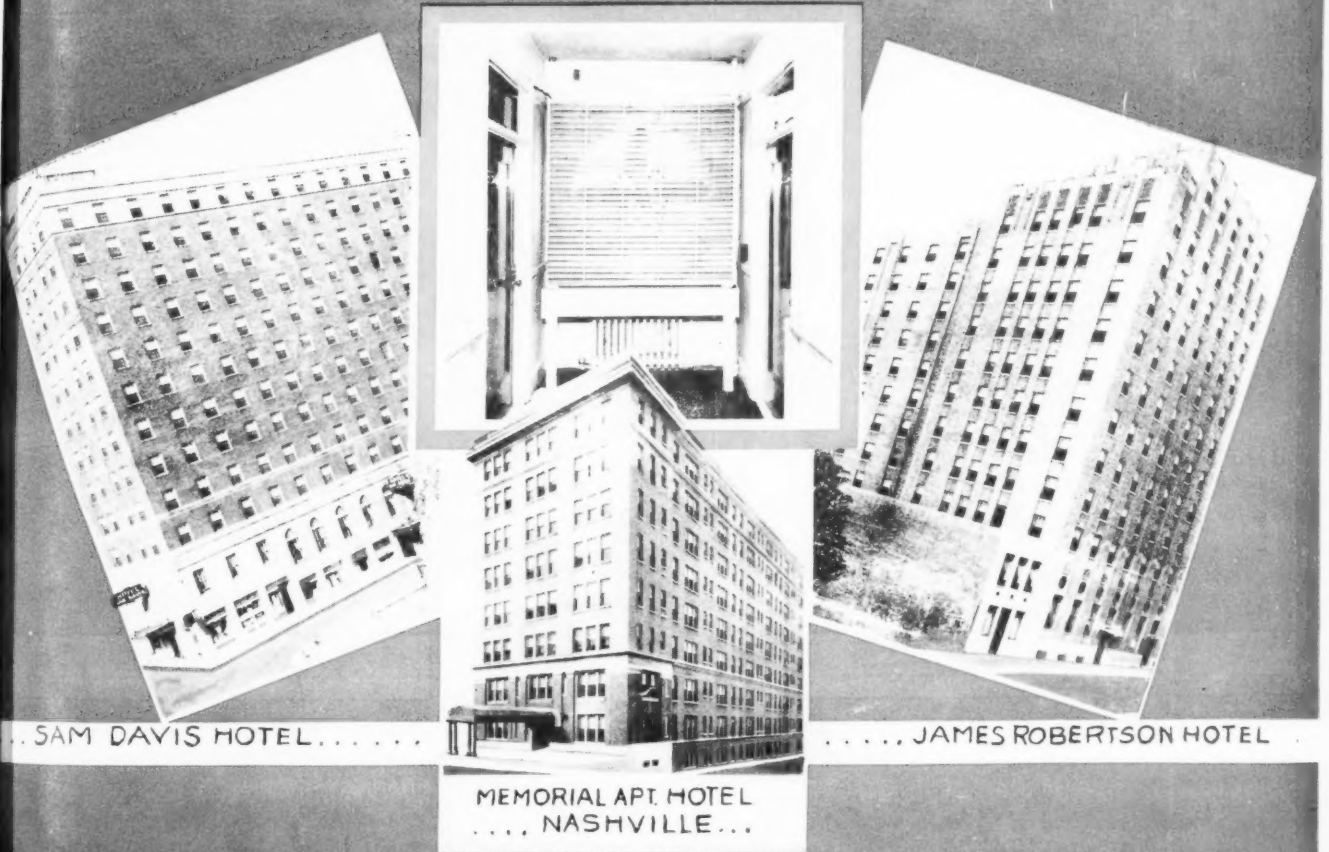


HERE are no more cautious and capable operators of Southern hotels than the Pritchett Bros. and Thomas Company.

After long study and tests of results to be obtained by the use of HUNTER Zephyr Cooling Systems this company of property managers has

installed these famous ventilators in their three popular Nashville hotels.

HUNTER counts this another important milestone in the development of natural air conditioning for hotel patrons who like to live in such comfort.



... SAM DAVIS HOTEL ...

... JAMES ROBERTSON HOTEL

MEMORIAL APT. HOTEL
... NASHVILLE ...

HUNTER FAN & VENTILATING CO., INC.

Factory: FULTON, N. Y.

General Sales Offices: Memphis, Storick Bldg.

Eastern Sales Office: New York, 92 Warren Street

ATLANTA
LOS ANGELES

BOSTON

CHICAGO
NEW ORLEANS

CLEVELAND

Sales Offices:
DALLAS
PHILADELPHIA

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HOUSTON
PITTSBURGH

KANSAS CITY
ST. LOUIS

Everything that range buyers want

ECONOMY
MORE COOKING PER DOLLAR

EASIEST CLEANING
JUST WIPE OFF — NO NEED TO REMOVE UNIT

SPEED

COOKS FOOD AS FAST AS FOOD WILL COOK

TWO-UNITS-IN-ONE
RINGS OF HEAT TO FIT ALL UTENSILS

EXCLUSIVE BLACK HEAT COOKING
BETTER TASTING FOOD

**STAINLESS STEEL
ADAPTOR RINGS**
RESIST CORROSION

SEVEN HEATS
TO MEET EVERY COOKING NEED

All in the NEW

CHROMALOX

Super-Speed
RANGE UNITS



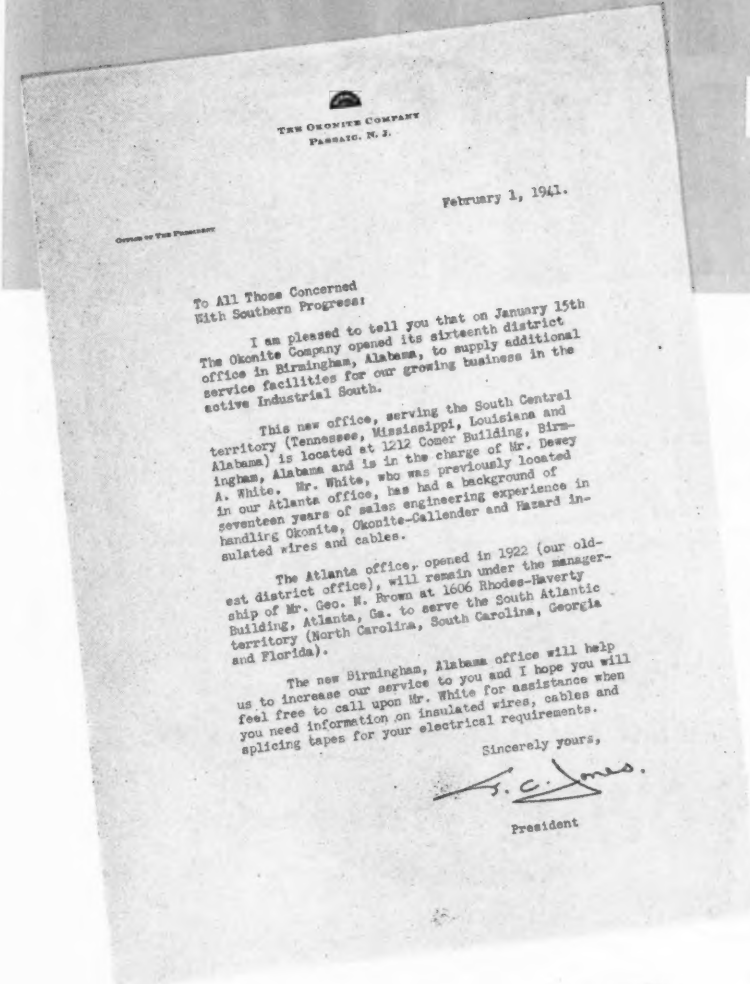
Put punch into your sales story. Read "HOW TO SELL MORE RANGES." Write for a copy, on your business letterhead.

EDWIN L. WIEGAND COMPANY, 7600 Thomas Blvd., Pittsburgh, Pa.

Write us or our nearest representative: ATLANTA, GA. — C. B. Rogers, 1000 Peachtree St. • DALLAS, TEXAS — L. R. Ward, 401 Southland Life Bldg. Annex • OKLAHOMA CITY, OKLA. — Paul Berry, Branitt Bldg. • RALEIGH, N. C. — W. R. Phillips

TO BETTER SERVE

the INDUSTRIAL SOUTH



To All Those Concerned
With Southern Progress:

I am pleased to tell you that on January 15th The Okonite Company opened its sixteenth district office in Birmingham, Alabama, to supply additional service facilities for our growing business in the active Industrial South.

This new office, serving the South Central territory (Tennessee, Mississippi, Louisiana and Alabama) is located at 1212 Comer Building, Birmingham, Alabama and is in the charge of Mr. Dewey A. White. Mr. White, who was previously located in our Atlanta office, has had a background of seventeen years of sales engineering experience in handling Okonite, Okonite-Calendar and Hazard insulated wires and cables.

The Atlanta office, opened in 1922 (our oldest district office), will remain under the management of Mr. Geo. N. Brown at 1606 Rhodes-Haverty Building, Atlanta, Ga. to serve the South Atlantic territory (North Carolina, South Carolina, Georgia and Florida).

The new Birmingham, Alabama office will help us to increase our service to you and I hope you will feel free to call upon Mr. White for assistance when you need information on insulated wires, cables and splicing tapes for your electrical requirements.

Sincerely yours,

President

Our sincere good wishes to the Electrical Industry of The South and to its able recorder and interpreter, Electrical South.

We hope that it will be the good fortune of our new Birmingham office to participate in a period of even greater and more rapid growth than the one whose history is so graphically recorded in the pages of this notable publication.

SOUTHERN OFFICES:

- Birmingham, Ala., 1212 Comer Bldg.
Mr. Dewey A. White, Manager
- Atlanta, Ga., 1606 Rhodes-Haverty Bldg.
Mr. George N. Brown, Manager
- Dallas, Texas, P. O. Box 694
Mr. Sam K. Dick, Manager



THE OKONITE COMPANY
Passaic, N. J.
HAZARD INSULATED WIRE WORKS DIV.
Wilkes-Barre, Pa.
OKONITE-CALENDER CABLE CO., INC.
Paterson, N. J.

**MANUFACTURERS OF
INSULATED WIRES & CABLES**



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Volume 21

Number 2.

PAPER INSULATED CABLES

AMARINE NETWORK CABLES

VARNISHED CAMBRIC CABLES

AMARINE SUBMARINE CABLES

AMERBESTOS CABLES

PARKWAY CABLES

BUILDING WIRES

SERVICE ENTRANCE & DROP CABLES

RELIANCE WEATHERPROOF WIRES

AMERCLAD CORDS & CABLES

*To help you meet today's
increasing demands for*

UNFAILING POWER!

WITH production schedules throughout industry expanding far in excess of all normal requirements, and with almost every community experiencing a new tempo of activity—electrical power assumes a position of vast importance! Thus, only the finest quality electrical wires and cables can be trusted with this

growing responsibility for power transmission and distribution. That's why electrical engineers and contractors confidently rely on American Steel and Wire Company products.

Every wire and cable manufactured by American Steel and Wire Company is a true product of outstanding quality and long-lasting

service—as perfect as modern methods can produce. Each one reflects a background of more than 100 years of engineering skill and manufacturing experience. American Steel and Wire Company wires and cables are available in a wide range of constructions, types and sizes — from the smallest magnet wire to huge submarine cables. Write today for complete information and catalogs.

AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York



Columbia Steel Company, San Francisco, Pacific Coast Distributors · United States Steel Export Company, New York

UNITED STATES STEEL

"THERE'S NO ART TO FIND THE MIND'S CONSTRUCTION IN THE FACE" - Shakespeare



-AND SILVERY SPANGLED GALVANIZING DOES NOT ALWAYS CONVEY

THE "INSIDE STORY" OF WHAT LIES BENEATH. IF YOU ARE LOOKING AT HUBBARD HARDWARE YOU MAY BE SURE THAT THE HEAVY, EXTERIOR COATING OF ZINC COVERS ONLY THE BEST GRADE OF NEW OPEN HEARTH STEEL, HELD TO RIGID SPECIFICATIONS, CAREFULLY INSPECTED, TESTED AND FABRICATED.

HUBBARD AND COMPANY
PITTSBURGH . . . OAKLAND . . . CALIFORNIA . . . CHICAGO

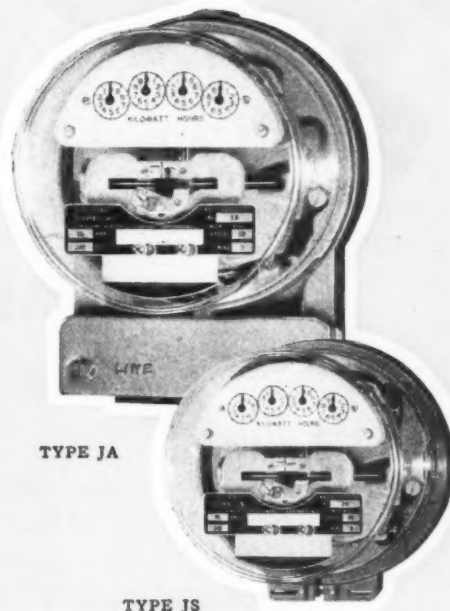
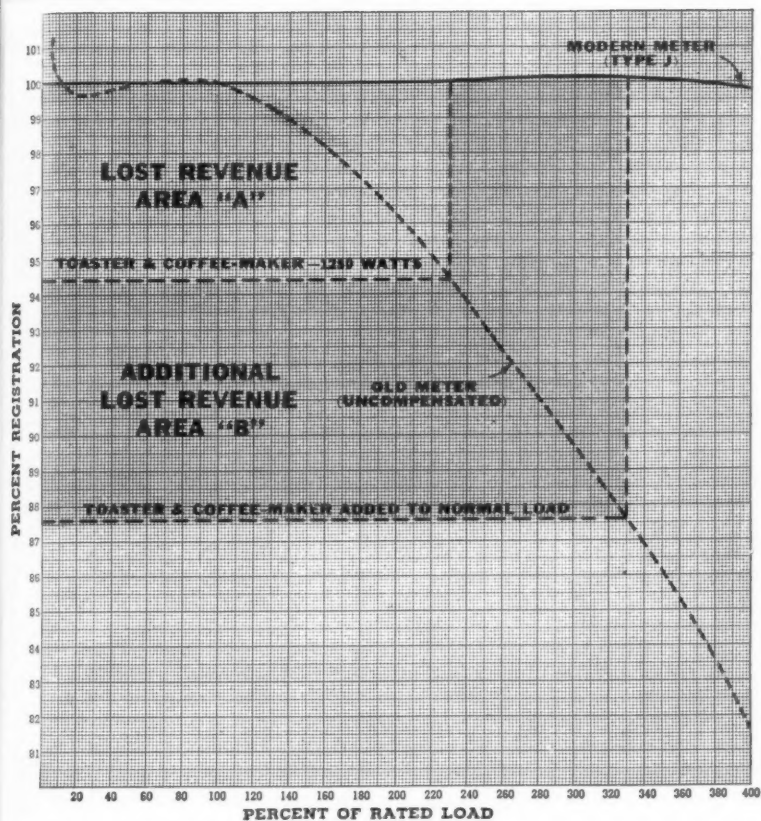


"HANG THE LOAD ON HUBBARD HARDWARE"

ADD REVENUE

Gains!

Modern Meters



Available in either "A" or "S" mountings, Type J Meters are designed for indoor and outdoor service. Ability to measure accurately loads ranging from a small percentage to 400 percent of the meter's normal full load rating, is an inherent characteristic of the Type J Meter.

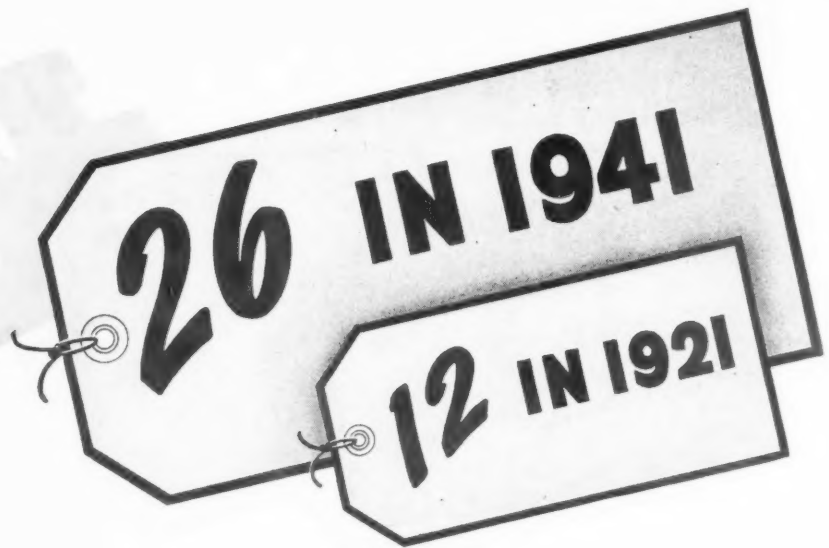
THE breakfast table in millions of American homes ably reflects the cumulative advertising efforts of merchandisers of electric toasters, coffee-makers, waffle irons, table grilles and other traffic appliances.

Full revenue from the use of such appliances will be obtained only by the accurate metering of these added loads. Measured by an old, uncompensated meter, the load of a toaster and coffee-maker—a common daily combination—can cause a registration loss of 5.6 percent, (see "Lost Revenue Area A"). This loss may be as great as 12.5 percent, (see "Additional Lost Revenue Area B"), when this load is added to other normal loads.

An adequate survey of individual operating properties will indicate where a change to modern meters will be a profitable investment through revenue gains.

COMPANY SPRINGFIELD ILLINOIS

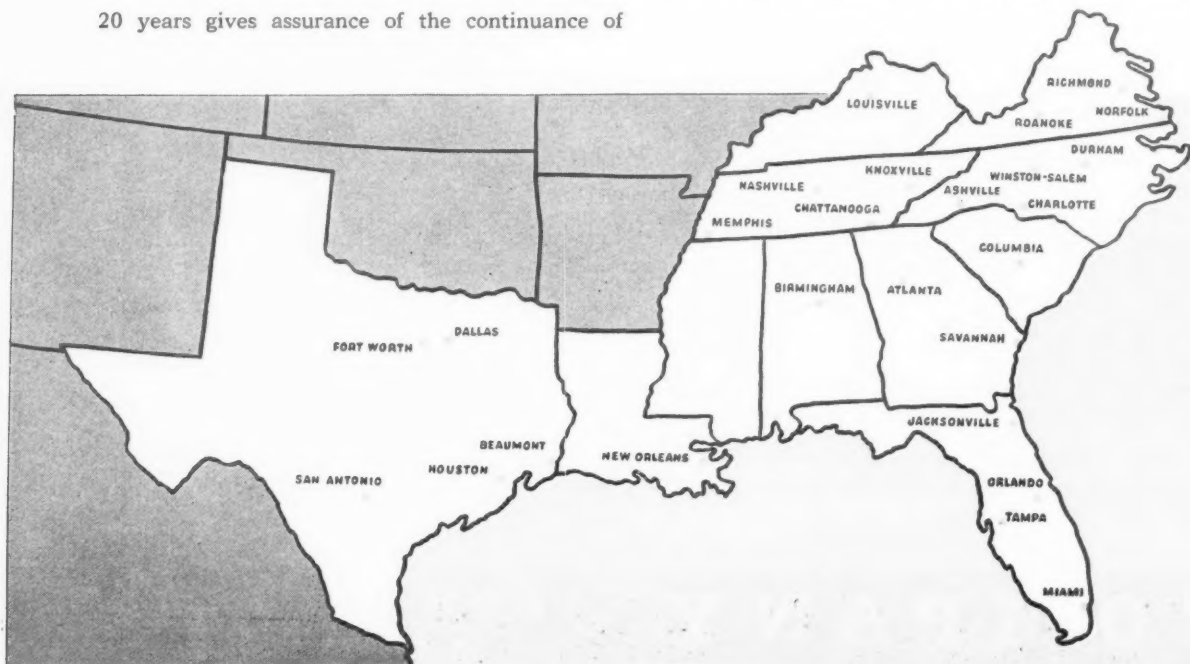
MORE THAN
DOUBLED IN
20 YEARS



26 SPECIALIZED SERVICE CENTERS *for everything electrical*

The addition of 14 GRAYBAR distributing centers since 1921 is an indicator of the South's conspicuous progress—and a mark of GRAYBAR's long-time policy to give adequate service *locally* in meeting needs for electrical equipment and supplies. » » » This important aid to the South's achievements in the past 20 years gives assurance of the continuance of

GRAYBAR's *specialized service* for future growth. Day in and day out GRAYBAR offers to Electrical Contractors and Dealers; to Utilities; to Industrial Plants; to all who require electrical equipment a convenient supply, sound advice, top-quality products — an all-inclusive service keyed to *your* needs.



Geared to the

GRAYBAR's distinct service is a real contribution to industrial expansion and better living for these 4 reasons:

1. An intimate knowledge of *your* needs acquired through long, close contact in helping you make the most effective use of electrical equipment.
2. An organization trained to *tag* for you "via GRAYBAR" the latest and best in electrical products as supplied by more than 200 manufacturers.
3. A *single* source with a stock of over 60,000 items which eliminates costly, "odd lots" shopping and provides efficient purchasing.
4. A *personalized* service of supply for meeting your *local* needs quickly, by prompt delivery from a nearby distributing house. "Via GRAYBAR" means placing at your disposal the purchasing power, the experience and the knowledge of a nation-wide distributing system located in more than 80 principal cities.

All of the GRAYBAR offices throughout the South stand ready to give you "action-service" on any electrical need.

GROWTH OF THE SOUTH



CONTRACTORS



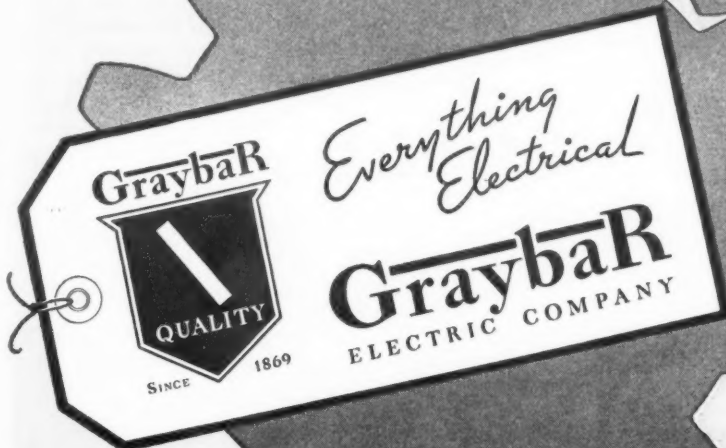
INDUSTRIALS



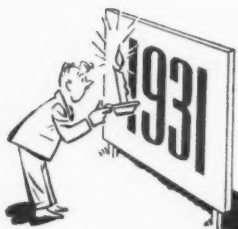
DEALERS



UTILITIES



WHY 50 FOOTCANDLES?



TEN years ago you could probably count the 50 footcandle installations in this country on the fingers of one hand. Throughout the length and breadth of the land they were few and far between. People felt it was wasting light to spread it around that way. Fifty footcandles? The idea!

Today there are many communities where the lighting industry has had the courage to sell, and customers have had the wisdom to buy lighting systems that provide as much as 50 footcandles. Such installations are still far from becoming common, but they begin to shine out in every lighting field—in stores, factories, offices.



Three important steps have made this possible:

- 1 The research which led to the Science of Seeing, proving the need for more light.
- 2 Development of new light sources which make the higher levels of lighting practical, and
- 3 Reduction in the cost of current—and lamps.

Fortunately for the lighting industry and for the eyes of the nation, all of these developments came along together, a firm foundation for demonstrating the need for better lighting, and the practical tools that make it possible.

Sometimes, however, we are inclined to forget the basic facts of the Science of Seeing on which this new era of Better Light for Better Sight is built. Even the lighting salesmen who today are selling the 50 footcandle jobs are not always conscious of the reasons for recommending such lighting levels.

They will be better salesmen and render their customers a better service if they review occasionally the fundamentals of the Science of Seeing. Toward this end, General Electric plans to publish during 1941 a



series of advertisements (of which this is the first) featuring some of the highlights of that Science. Toward this end we suggest an answer to the question, "Why 50 Footcandles?"

How Many of Your Customers Know These Facts:

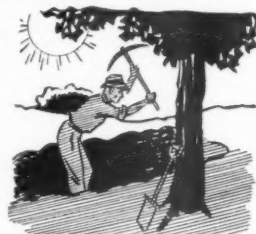
Three factors are necessary for the act of seeing: the eye, the object to be seen, and a source of light.

Our eyes developed during thousands of years of outdoor seeing—under daylight levels of lighting and long distance vision. Only within the last few generations have we moved indoors and subjected our eyes to artificial light and difficult visual tasks.

Our ancestors did most of their seeing under 5,000 to 10,000 footcandles in the sunlight and 200 to 1,000 on overcast days or in the shade of a tree.

Today, most people attempt much more critical seeing under light only 1 or 2% of that. The result may be eyestrain, fatigue, nervousness and eventually the impairment of vision.

The human body is a seeing machine.* We see with more than our eyes alone. Our whole nervous-muscular system is affected. In fact, the strain of prolonged seeing under difficult conditions may be more tiring than the hard physical work of digging a ditch.



Are You Dramatizing the Science of Seeing with Such Simple Facts—

- THAT it takes 3 times as much light to read a newspaper with the same ease as it does a well printed book?†
- THAT good light aids poor eyes even more than normal eyes?
- THAT it is estimated we are using our eyes for severe visual tasks about 30% more than was common a generation ago—and many times more than a century ago?
- THAT a fourth of our children have defective vision?
- THAT three-fourths of all people over 50 suffer from defective vision?

Many complex laboratory researches have demonstrated that we see faster, more easily, and with less fatigue, the closer we come to outdoor seeing conditions.

*See Chapter VI, "The Science of Seeing" by M. Luckiesh and Frank Moss
†See Chapter V, "The Science of Seeing"

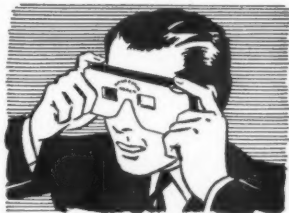
G-E MAZDA LAMPS



Typical of many of today's better fluorescent lighting installations is the better than 75-footcandle illumination in Pugh Brothers' jewelry store in Youngstown, Ohio. Tests show that better light speeds sales, makes merchandise more attractive, and improves employee morale.

In other words, *better light* literally means *better sight*.

Furthermore, the average person, when given the opportunity to select the amount of light under which he can most easily perform a fairly difficult seeing task like reading a newspaper, selects somewhere between 100 and 200-footcandles.



So to the question "Is 50-footcandles of light enough for critical seeing?" science can only answer "No. Generally you need all you can get." But 50-footcandles is a long step in the right direction—and it is easy to get with modern light sources and equipment.

Of course, every lighting job should be considered individually and planned to produce the best results. The lighting engineer equipped with his light meter to measure light accurately, and his visibility meter to determine the visibility of the task, can easily solve any lighting problem and recommend the proper treatment.

Forty-Niners Club Announced

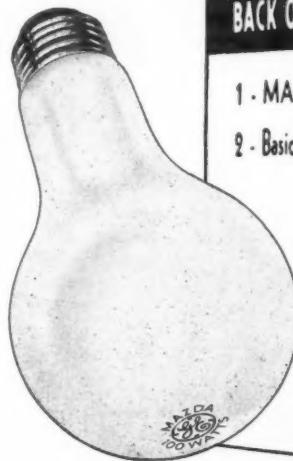
SOME twenty years ago, General Electric welcomed many lighting salesmen to membership in a 10 Footcandle Club. That was considered good lighting back in 1920. But science has revealed new goals. The tempo of modern business demands more of lighting.

In 1941 this Club is brought up to date as the Forty-Niners Club, and the honor of membership is extended

to any salesman who has been primarily responsible for selling an installation of 49-footcandles or more, or to any executive who works under 49-footcandles. The attractive emblem shown at the right will be sent to all members. A brief description of the installation, attested by the sales manager, is all that is necessary for membership. Send it to Secretary, Forty-Niners Club, General Electric Company, Nela Park, Cleveland, Ohio, or consult your G-E Lamp Division for further details.



REMEMBER:



BACK OF EVERY G-E MAZDA LAMP

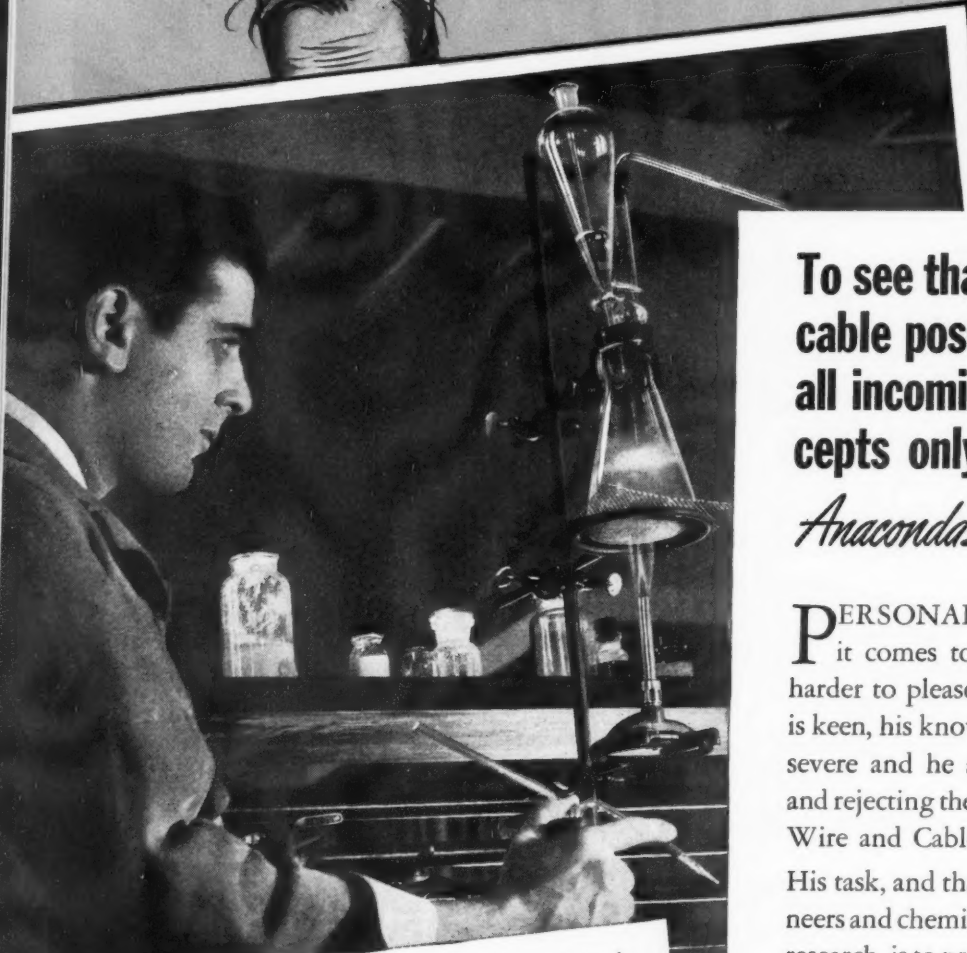
- 1 - MAZDA research and development
- 2 - Basic researches in Science of Seeing
- 3 - National advertising of lamps and lighting
- 4 - Development of new lamps and new applications of lamps
- 5 - Cooperation in equipment development

GENERAL  ELECTRIC

This man



GETS IN PEOPLE'S HAIR



To see that you get the best cable possible he checks on all incoming materials...accepts only those that meet *Anaconda's Rigid Standards*

PERSONALLY, he's "tops" but when it comes to cable materials he's even harder to please than he is to fool. His eye is keen, his knowledge sound, his standards severe and he applies them all, accepting and rejecting the materials used in Anaconda Wire and Cable.

His task, and that of the other trained engineers and chemists entrusted with Anaconda research, is to protect quality...to insure that every length of wire and cable measures up to the name behind it...which means —flawless as the skill, science and long experience of Anaconda can make them.



This man plays no favorites. His job has only one purpose: making Anaconda Wire and Cable the best possible obtainable. Through his "lab" pass incoming materials and only those that live up to Anaconda's standards of quality get by.



Some materials must pass severe aging tests in this oven and many other tests, before being released for process. In this way, you are sure that you get the highest quality wire and cable when you buy Anaconda.

USE MODERN IMPROVED

Anaconda Wire & Cable

ANACONDA WIRE & CABLE COMPANY, General Offices: 25 Broadway, New York City; Chicago Office: 20 North Wacker Drive
A Subsidiary of Anaconda Copper Mining Company. Sales Offices in Principal Cities

FEBRUARY,
1941

Volume 21 No. 2



ELECTRICAL SOUTH

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W. E. COOGLER, Production Manager

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ATLANTA, GEORGIA

MEMBER OF A. B. P.
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ANNUAL SUBSCRIPTION—\$1.00
THREE YEARS—\$2.00
CANADA—\$1.50; FOREIGN—\$2.00

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L. E. ALLEN, 189 West Madison St.,
Chicago, Ill.
L. R. McCARTY, 325 Winding Way,
Merion, Pa.
W. A. McGER, P. O. Box 562, Charlotte,
N. C.

Published Monthly by

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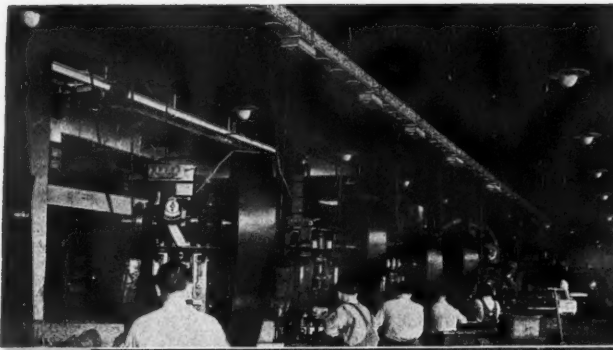
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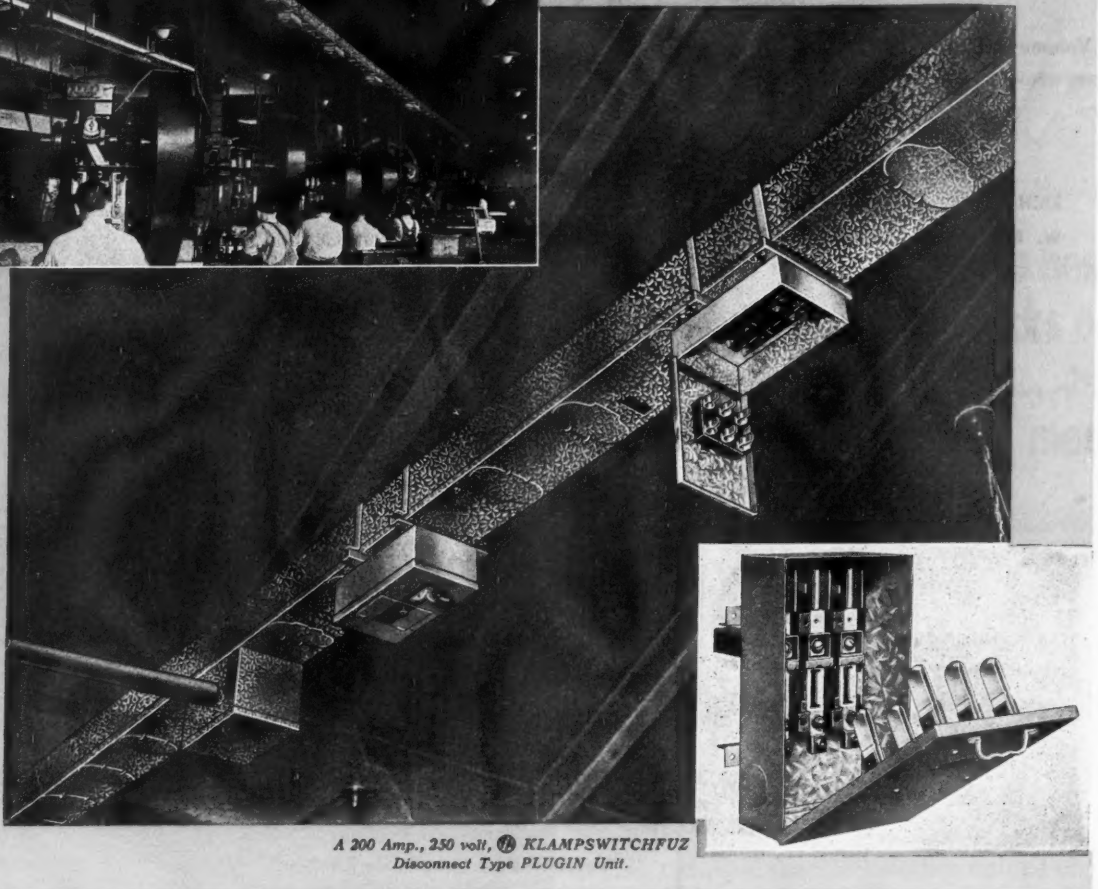
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In a shop like this, **PLUGIN** [Ⓢ]
BUSDUCT provides the maximum
in flexibility for power distribution.



A 200 Amp., 250 volt, [Ⓢ] **KLAMP SWITCHFUZ**
Disconnect Type **PLUGIN** Unit.

Move the machine — plug in — go!

It's as simple as that when the plant is equipped with Plugin [Ⓢ] Busducts. The easily-accessible outlets, conveniently spaced, make it possible to place machines at any desired location — to plug in quickly—and to commence operation without delay. With Plugin [Ⓢ] Busducts, use Feeder [Ⓢ] Busduct to provide ample capacity for present and future power requirements.

This is the Modern Way!

This is the compact, flexible and convenient method for power and light distribution. The busducts may be attached to either walls or ceilings. Flexibility is provided by suitable elbows, tees, end boxes, intermediate feed-in and feed-out boxes — all adapted to fit required space or position. Future extensions may be made readily to existing installations.

[Ⓢ] Busducts—both Feeder and Plugin types—are made in standard 10-foot sections. Each section of the Plugin type is arranged with nine plug-in outlets on 12-inch centers. The copper bus bars (contained in enclosures of galvanized steel or aluminum) are rigidly supported at 30-inch intervals by specially designed insulators that assure proper spacing — to meet requirements of the National Electrical Code. Contact surfaces of connecting bars are silver-plated, to prevent oxidation. For 2, 3 and 4-wire feeder systems; 250 volt DC, 575 volt AC, maximum.

[Ⓢ] Sales-Engineers Can Help Manufacturers, Architects, Engineers and Contractors With Their Distribution Problems

Their long experience and training are at your service — without obligation. Write for the name and address of the one nearest you. Also, for Bulletin 61, which contains complete descriptions, applications and detail drawings of [Ⓢ] Busducts . . . Frank Adam Electric Company, St. Louis, Mo.



Published in the Interests of the Southern Electrical Jobber, Dealer and Contractor, the Commercial Phases of Central Station Work, and all Persons who sell Electrical Service or Appliances

• 1921

Our Twentieth Anniversary

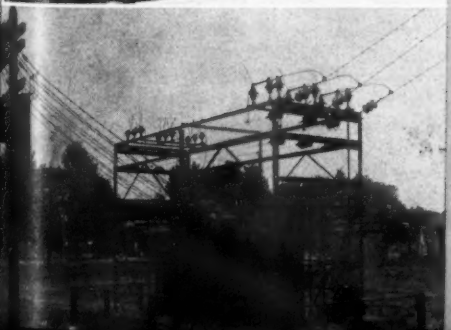
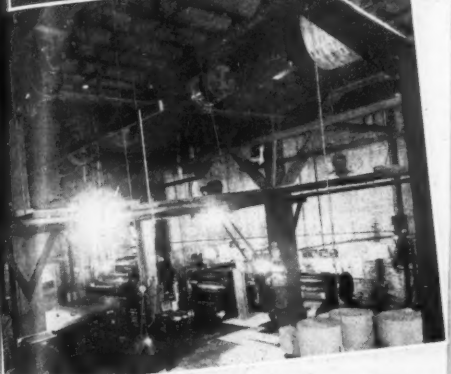
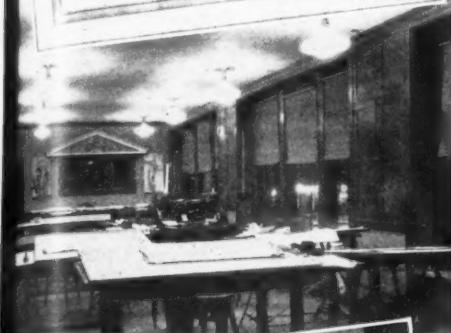
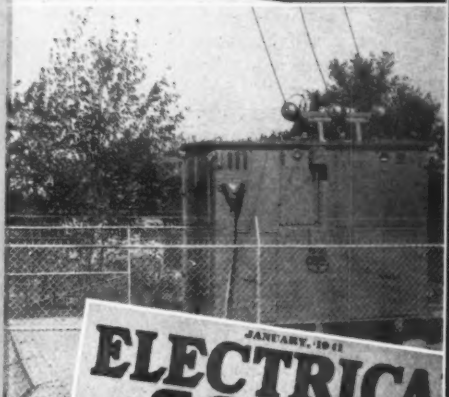
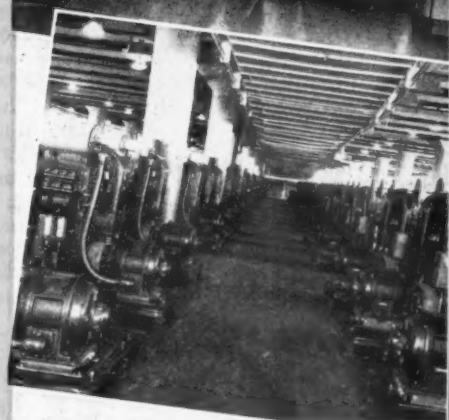
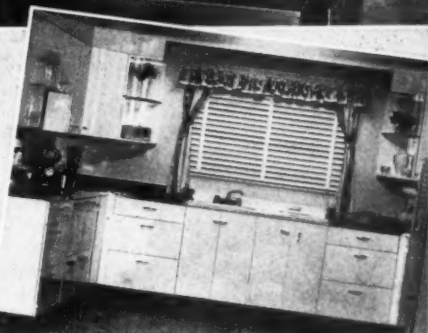
● "Twenty Years of Electrical Development in the South," is the keynote of this issue of **ELECTRICAL SOUTH**, marking its twentieth year of publication in the interests of the electrical industry of the Southeastern and Southwestern States.

● A twentieth birthday, in an industry that is more than fifty years old, may not be significant in itself. The impressive fact is that the past twenty years constitute a period of extraordinary progress and achievement in the electrical industry of the South, surpassing the record of the nation as a whole in such important features as percentage increase in wired homes, rural lines, number of customers, appliance sales, and electric output.

● No mere chronicles of the events of the past twenty years are the articles of this issue. Contributed by leaders of the electrical industry, each an authority in his field, they provide an interesting background against which existing conditions are reviewed and the future anticipated.

● Considerable space is devoted to rural electrification and the electrification of industry because these applications have made the most significant contributions to the social and economic welfare of the South. In other articles, leaders of the industry discuss the trends of the past twenty years from the vantage point of their particular branch of the industry. Concluding articles outline product development in the fields of wiring, lighting, appliances and distribution.

1941 •



RURAL ELECTRIFICATION

Twenty years of progress in the South indicates a new economy for the "one crop" southern states

By C. E. Seitz

Head of Agricultural Engineering
Department, Virginia Polytechnic
Institute, Blacksburg, Va.

WHEN this magazine was established in 1920, only about 11,000 farms in the fifteen southern states were receiving central station electric service. According to a Rural Electrification Administration survey, by June 30, 1940, over 505,000 farms were receiving service. While this expansion has been steady over the twenty year period, a greatly accelerated development has taken place during the last five years. Rural electrification has provided a means through which thousands of southern farmers have been able to improve their economic and social status. To my mind, it is the most significant development of the past two decades, with promising possibilities of aid in solving the many difficulties confronting southern agriculture.

Organization of the Rural Electrification Movement

The first important stimulus given to rural electrification was the inauguration of the rural electrification movement by the National Committee On the Relation of Electricity to Agriculture. This committee was organized and com-

menced work on August 1, 1923, following negotiations between representatives of the American Farm Bureau Federation and the National Electric Light Association. The function of this organization as stated was "to give purpose and direction to a national movement looking toward the solution of the problem of getting electric light and power service to the farms of the United States."

The original committee was composed of representatives of the American Farm Bureau Federation, National Electric Light Association, American Society of Agricultural Engineers, Power Farming Association, and the United States Departments of Agriculture, Commerce and Interior. Later, other leading national organizations interested in the welfare of agriculture joined the committee. State committees were organized in twenty-four states, including Alabama, Oklahoma, South Carolina, Texas

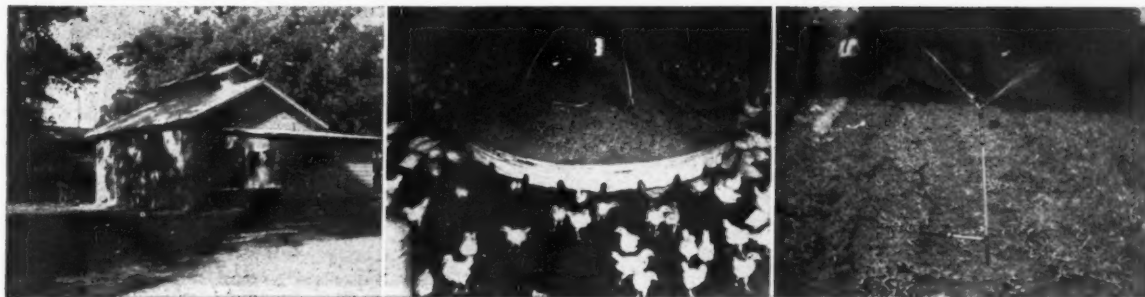
and Virginia in the South. The keynote of this movement was a national investigation program designed to find out what electricity would do and what it would not do on the farm. In each state, the agricultural colleges or agricultural experiment stations directed the investigational work undertaken.

Numerous practical and economical uses of electricity in agriculture were developed through these cooperative investigations. These studies proved the value and need for electricity on the farm. The pioneering work of these committees in cooperation with electric service organizations, agricultural colleges and experiment stations laid a sound foundation that greatly aided the later development of rural electrification. This coordinated effort throughout the nation played a most important part in convincing the general public of the importance and need of electricity in agriculture. It is my opinion that this focussing of public attention on rural electrification had much to do in creating public sentiment which resulted in the legislation creating the Tennessee Val-

Number of Farms Receiving Electric Service

STATE	1920		1926*		1930*		December 1934*		June 30, 1940**		
	Farm	Farm	Farm	Farm	Farm	Pct. Farms	Farm Consumers		Pct. Farms Electrified		
	Consumers	Consumers	Consumers	Consumers	Consumers	Electrified	R.E.A.x	Other			
Alabama		2,000	12,001	11,055	4.0	10,331	29,556	14.0			
Arkansas		1,100	3,202	2,943	1.2	7,278	7,346	5.8			
Florida		1,015	4,385	5,700	7.8	2,135	7,028	11.8			
Georgia		510	4,372	6,956	2.8	32,151	16,243	19.2			
Kentucky		4,200	6,815	8,480	3.0	18,482	17,633	12.0			
Louisiana		900	2,218	2,826	1.7	5,473	10,707	9.1			
Mississippi		1,000	3,548	2,802	0.9	18,075	6,407	7.6			
North Carolina		2,467	9,450	9,672	3.2	14,600	65,973	25.0			
Oklahoma		2,300	4,517	5,648	2.6	9,947	7,546	8.5			
South Carolina		1,250	3,493	3,796	2.3	9,242	21,170	18.3			
Tennessee		3,225	7,585	9,727	3.6	17,592	13,077	10.7			
Texas		6,100	11,501	11,466	2.3	35,007	35,661	14.7			
Virginia		3,300	10,105	14,954	7.6	10,641	38,643	24.8			
Maryland		2,700	6,680	6,791	15.3	793	15,894	37.7			
West Virginia		900	2,891	3,647	3.5	668	20,159	18.3			

* Edison Electric Institute. ** R.E.A. Survey. x Includes mileage jointly financed with T.V.A.



These photos illustrate a few of the many profitable uses of electrical service on the farm. From left to right, and top to bottom: (1) Automatic electric heat eliminates sweet potato losses in this storage house. (2) Firesafe, automatic brooders lead all other types for all around brooding results. (3) Actual tests prove that even in a good season, irrigating the farm garden increases yields 50%. (4) Electric milk and dairy product coolers make it possible for even the smallest producer to market high quality products at premium prices. (5) Dairy utensil sterilizers heated by electricity take the guess work out of this important operation. (6) Low-cost electric feed grinders now make it possible to grind home grown grains at home.

ley Authority and the Rural Electrification Administration.

Development Through Private Utilities and Government Agencies

From the beginning of the organized movement for rural electrification in 1923, many private electric companies throughout the South have been active in extending their lines to farms and rural areas. Most of these companies cooperated effectively with the state committees in carrying on the investigations which laid the ground work for the later developments. The more progressive of these companies early organized rural service departments and employed trained agricultural engineers to contact and work with farmers in the selection and use of electrical equipment which would be of the greatest value in increasing the farmers' income and improving his living conditions. These men have been, and are now, rendering a valuable service to the farmers on their lines. Much has been accomplished by these companies. Thousands of miles of rural lines have been extended and by June 30, 1940, according to R.E.A. surveys, over 313,000 farms were being served by operating organizations other than the R.E.A. electrical membership corporations.

Virginia and North Carolina can be cited as examples of the development by private utilities in the southern states. When the organized program of rural electrification was begun in Virginia in 1924 there were about 300 miles of rural lines with about 1500 rural customers, of whom about 500 were

farms. The private companies had extended around 10,500 miles of rural lines in the state and, according to R.E.A. figures, were serving about 38,000 farms by June 30, 1940. In North Carolina, the private utilities have done an outstanding job in recent years. On December 31, 1935, there were 11,558 farms being served. By June 30, 1940, 65,973 farms were being served in North Carolina by organizations other than R.E.A. Much of this progress is credited to the North Carolina Rural Electrification Authority.

The Tennessee Valley Authority has contributed much to the development of rural electrification in the South. About 50,000 farms and 30,000 other rural customers were receiving power over T.V.A. lines at the end of August, 1940, according to a T.V.A. statement. The Authority, through its Agricultural Engineering Division, is cooperating effectively with the Land Grant Colleges of the seven Valley states in conducting a cooperative research and educational program in rural electrification. As stated by C. W. Hurd, "Cooperative extension specialists in rural electrification education conduct a coordinated educational program on the relation of electricity to agriculture. These specialists devote a large part of their time in conducting training schools for county extension workers and personnel of power distribution agencies. They also conduct demonstrations and give technical assistance to farmers, and prepare bulletins and other descriptive material on farm and home electrical



equipment and similar subjects.

"Cooperative research projects between the Authority and the Land Grant Colleges are being conducted on farm electrical equipment applicable to the conditions of the region. The objective of this work is to secure data on present farm electrical equipment operating under southern conditions and to make studies and to develop new uses or adaptations of electrical equipment that will make additional contributions to farm income." Through this cooperative effort data has been secured for the publication of a number of extension and experiment station bulletins on the use of electricity for various farming operations. Such publications are greatly needed and are a valuable

means of education in rural electrification.

The Rural Electrification Administration, which was established in 1935, has given a great stimulus to the development of rural electrification in the South. Up to June 30, 1940, this agency had advanced over \$82,306,000 in funds to 281 borrowers in the fifteen southern states. Most of these borrowers were electric cooperatives. Over 99,000 miles of lines were energized and over 192,000 farm consumers were being served in the South by R.E.A. lines as of that date. It is evident that the existence of this agency greatly stimulated a number of the private utilities to increased activity. The average percentage of farms securing service from pri-

vate and public agencies in the South increased from 4.1 per cent in December 1934, to 15.8 per cent by June, 1940.

The R.E.A. is working on the principle of making electric service available to as many residents as possible on an area basis. Real progress is being made in the extension of lines and when the present program of lending money for line extensions is backed up by an adequate and sound program of research and education the farmers will begin to secure the fullest benefit from this service.

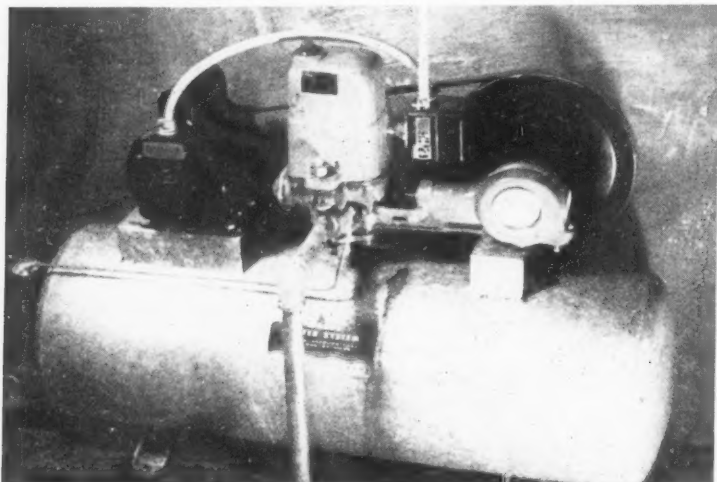
Contribution of Rural Electrification Toward Balanced Agriculture

Rural electrification is making a substantial contribution to the establishment of a basis for a more diversified agriculture, one of the major objectives which the agricultural colleges of the South have been striving for these many years.

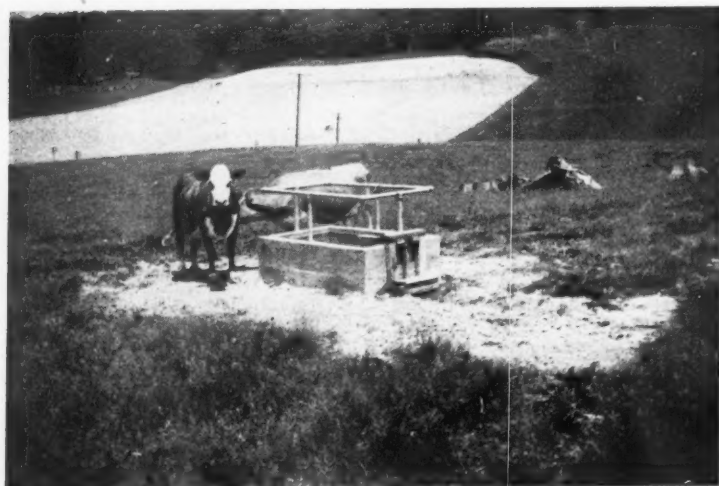
As expressed by Rob B. Craig, deputy administrator of the REA: "In many ways rural electrification has important contributions to make to the problems arising out of over-specialization and one-crop farming. We are told that the agricultural South depends on cotton and tobacco for two-thirds of its cash income, and that more than half of the farmers depend on cotton alone. In other words, the welfare of these people depends on a single crop of which the prices are subject to widest fluctuations, ranging from 6 to 20 cents since 1927. With this widely fluctuating price situation as a basis for credit it is little wonder that mortgage indebtedness and interest charges have increased year after year.

"The result, of course, has been more tenant farmers, tilling land they do not own. Today more than half of the South's farmers are tenants. Low incomes, concentration on cash crops which have suffered in world markets, and other conditions, have made tenant families the most unstable part of the population. Many of them move every year, with the consequence that they have little or no incentive to protect the soil resources or establish homes in a community.

"Notwithstanding the availability of enormous productive resources, statistics indicate that southern farmers do not raise many of the things they need, and consequently must purchase four-fifths of all they eat and wear. Rural electrification has an important contribution to make to the im-



The electric water system provides running water for poultry, livestock and garden irrigation, saving labor and increasing farm income. The stock watering trough shown below, when installed in pastures, pays big dividends in better animal growth and milk production.



provement of this situation, because it makes possible modern production of many essentials. For instance, Rupert B. Vance tells us that compared with the national per capita consumption, the South has a shortage of 121,000,000 gallons of milk and a comparable shortage of 18,500,000 head of pure bred cattle. He says further that these States, based on minimum standards, also have an annual shortage of 70,000,000 dozen eggs, a shortage not met by income from other sources. To make up the deficiency in cattle alone would require eight times the area now given over to pasture lands.

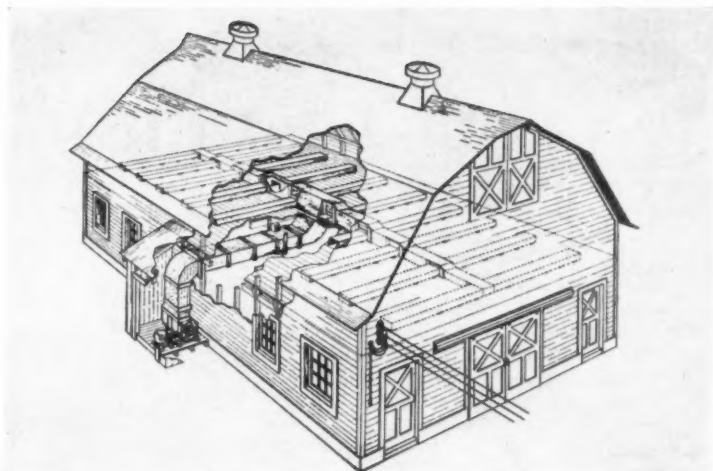
"The importance of electricity to successful dairy and poultry operations cannot be overemphasized, because it supplies the light, heat and power for pumping water, grinding feed, operating milking machines and milk coolers, and for brooders. The most important of these contributions of electric power, however, is that it enables farmers to increase their income through diversification of their crops, and at the same time protect soil resources."

A diversified agriculture calls for an increase in farm livestock which results in producing and feeding more corn and small grains on the farm. Small electric feed mills well adapted for farm grinding result in lower grinding costs and more efficient results from feeding. Scarcity of custom mills adds to the necessity of small individually owned equipment.

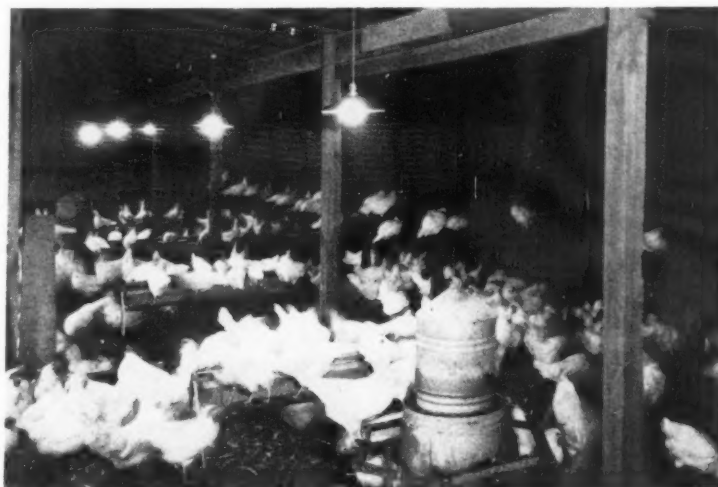
Diversified Agriculture Means A "Live At Home Program"

Diversifying farming operations also means adding a limited number of dairy cows for home supply of dairy products, which are so greatly needed to improve the diet of southern farm people. Low cost refrigeration, water heating and sterilizing equipment adaptable to limited dairying makes it possible for the farmer to market high quality butter, buttermilk, cream or other dairy products at premium prices. This would be difficult without electricity.

Diversification includes sufficient poultry on each farm to produce eggs and fowl for home consumption as well as provide an important source of additional income. Electricity contributes to the poultry enterprise by providing the most important method of brooding and lights for aiding in the control of egg production. These



Thousands of tons of hay are lost in the South each year due to unfavorable weather for field curing. A higher grade of hay is produced in the low-cost barn drying system illustrated here which utilizes a fan to force air through the hay in the mow. Below, proper use of electric lights on laying hens to control egg production results in the highest possible income from eggs and assures a year-round supply for the farm family as well.



two uses for electricity on the farm are now recognized as being essential in good poultry management.

A diversified agriculture means a "live at home program" which calls for more and better farm gardens. Good gardens result in a decrease in the amount of money spent for food for farm families and supplementary income may be derived from surplus foodstuffs that are produced. The electrical water system more than pays for itself by its use for irrigating the farm garden. Irrigation increases crop yields and insures against loss resulting from deficiency in rainfall. This farm use of the pump justifies its installation economical-

ly and makes it possible to have the comfort, health and convenience of running water in the home.

It is estimated that 50% of the 64,000,000 bushels of sweet potatoes annually produced in the South is lost due to improper facilities of curing, handling and marketing. Electrically heated curing and storage houses are making possible the production of higher grades of sweet potatoes, eliminating losses due to faulty storage and bringing higher market prices. This method of curing enables the product to be stored over a longer period and makes it possible to take advantage of the best marketing season, re-

(Continued on page 90)

THE TREND TOWARD

Industrial Electrification

A most important factor in the development of industry in the South in the past twenty years

INDUSTRIAL electrification, industrial development, and central station expansion go hand in hand. They are inseparable, what affects one affects the other.

To illustrate the development of industrial electrification throughout the South in the last twenty years, the two accompanying charts are offered to show the growth of the central station industry in the South. These charts were originally used by Rex I. Brown, president of Mississippi Power and Light Company, in an address before the General Sales Conference of the Southeastern Electric Exchange, in Atlanta, November 14, 1940, entitled "An American Industry Already Prepared." These charts were used for another purpose. However, if our readers will accept the author's statement that at least 60% to 70% of the load of the central stations in the South is classified as power (wholesale, retail and commercial) then these same charts became a real measurement of the growth of industrial electrification in the South over a

period of twenty years.

Chart No. 1 illustrates the scarcity of central station transmission in the South in 1918 of 60,000 volts and over. Of course, there was some transmission with a voltage less than 60,000 volts, and some municipal plants serving industry, and in addition, a number of isolat-

Tennessee Valley Authority, nor does it reflect isolated industrial plant loads such as the many paper mills, rayon plants, and refineries, which have come into being in the South in the last few years.

Twenty years ago a manufacturer operating an electrified plant was still a pioneer, an entrepreneur. Today, a mechanically driven plant is more or less of a curiosity.

The tremendous growth in industrial electrification has been as great in the change-over of existing mechanically driven plants as it has been in new plants coming into existence, or migrating from other parts of our country.

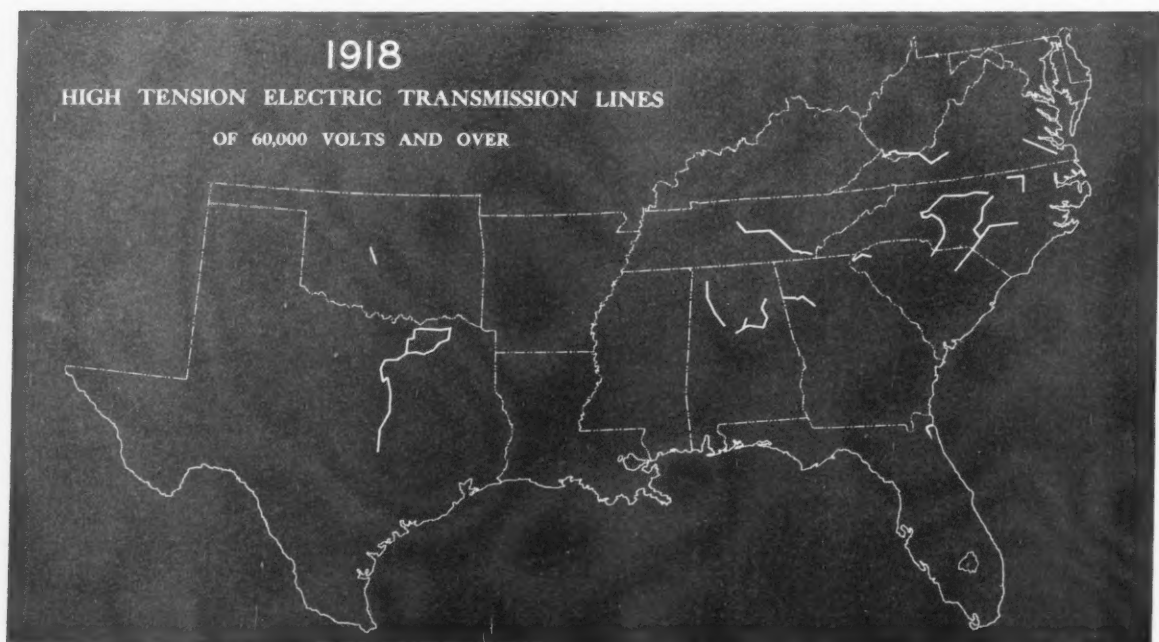
It is easy to see why, perhaps, a new plant just starting up, or moving in, would be electrified, if for no other reason than to save the capital cost of a power plant thereby having more money to invest in productive equipment or why an existing outfit would scrap a worn out, obsolete power house and take

By Edwin M. Clapp

Manager Power Sales Division
Georgia Power Co., Atlanta

ed industrial power plants.

Chart No. 2 illustrates the growth of central station transmission in the South over the twenty year period, ending 1940. This chart does not reflect the network of 11 kv to 44 kv feeders branching out from the trunk lines. This chart does not show the lines of the



(Courtesy Miss. Power & Light Co.)

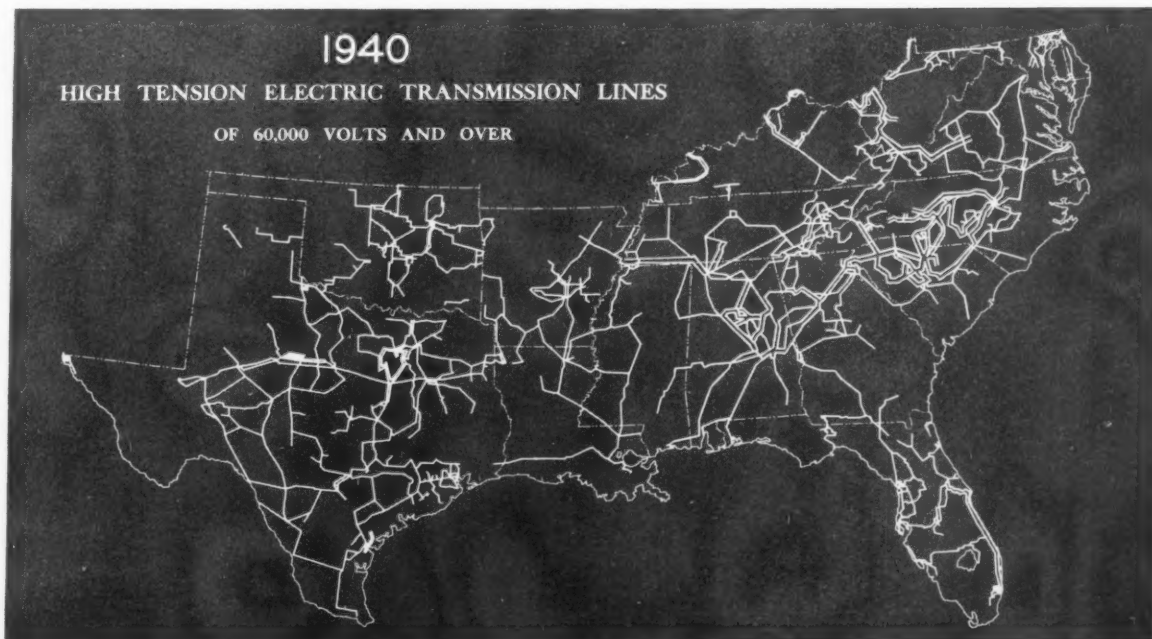
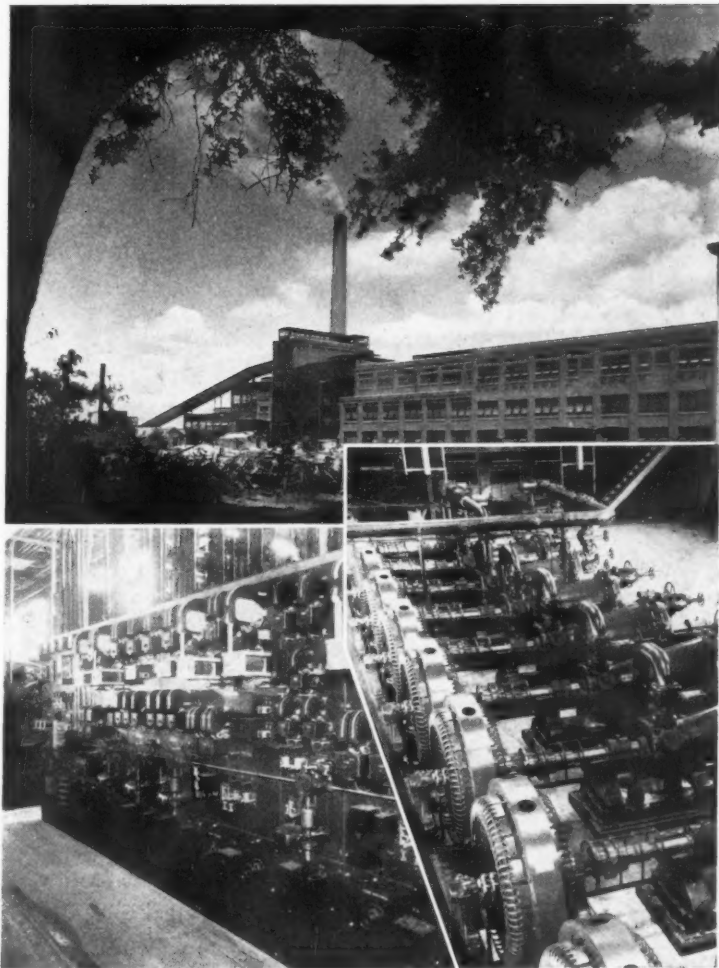
Typical of the new industries locating in the South is the Union Bag and Paper Corp., near Savannah. Photos at right show views of the plant including a large group of synchronous motors and the control panels for them.

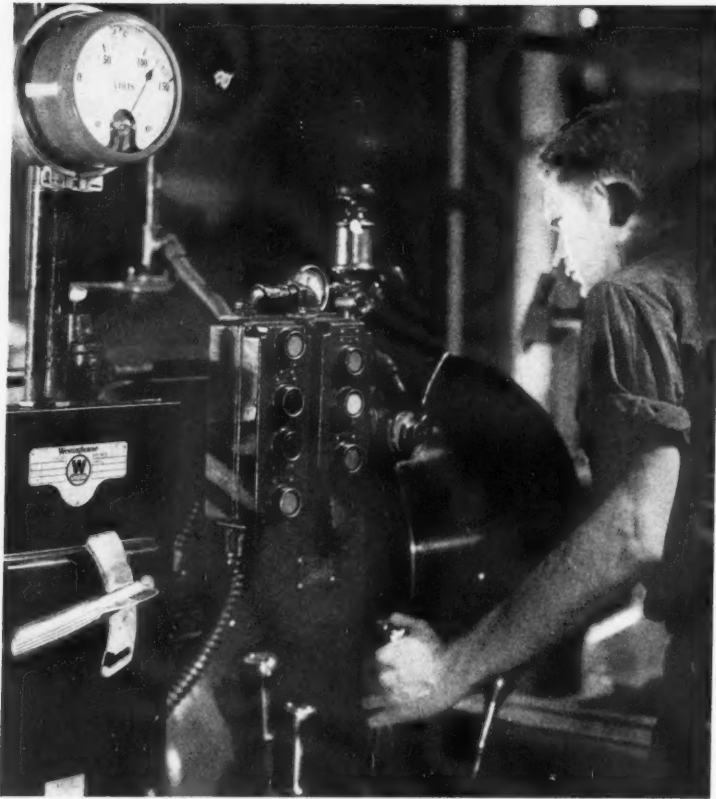
central station service, spending its money for electrification rather than a new power plant. However, when an existing concern will spend the money to put in a modern electric generating station and electrify their plant, in addition, there must be something to this electrification business.

The average American industrial institution is not philanthropic or eleemosynary when it comes to spending capital funds for productivity. The most liberal require at least a 5:1 pay off on their money and the majority 3:1, and yet today industrial electrification, regardless of the source of power, is almost universal. Why?

This paper is not a case for the central station even though we quote herewith a few of Reddy Kilowatt's "Plus Advantages" in an-

These charts indicate the rapid expansion of electric service in the past twenty years. Since from 60% to 70% of the load of central stations is classified as power, these charts, to a certain extent, are a measure of the growth of industrial electrification.





"Industrial electrification, regardless of the source of power, is almost universal. Twenty years ago a manufacturer operating an electrified plant was still a pioneer, an entrepreneur. Today, a mechanically driven plant is more or less of a curiosity."

swer to the question raised in the preceding paragraph: adaptable, adequate, automatic, available, clean, convenient, economical, efficient, flexible, modern, quiet, reliable, safe. Industrial electrification has not come into being because of any big saving in power cost—if the saving in power cost will pay only the fixed charges on the capital investment required it is a plenty; the real pay-off is in the constancy and uniformity of speed of the driven machine, which spells increased production and improved product.

The universality of industrial electrification as it exists today has been earned in the hard school of experience, and the patience of the industrialist with the consulting engineer, manufacturing research, and the central station engineers while they worked out one problem after another never ending, has been reasonably well rewarded.

Let us stop and consider for a minute some of the problems of industrial electrification which

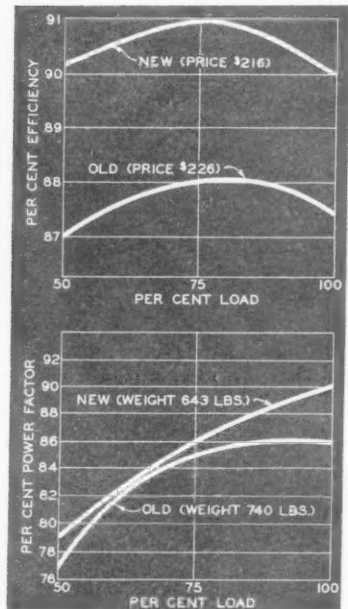
have been overcome in the last twenty years.

The development in the art of central station transmission and generation has been phenomenal over the last twenty years. Improvements in network transmission, instantaneous reclosing, lightning arresters, voltage regulators, tap changing transformers, automatic reclosing switching equipment, and communication, have all done their part toward making the rendition of central station service practically uninterrupted. Many of our readers will remember when even a dark cloud in the sky would cause a shudder as to what the outcome of that particular afternoon's production would be. Incidentally, purchased power costs have been reduced better than 20% in the last few years.

Research in metallurgy and thermodynamics has brought the overall economy of isolated plant operation from around three pounds of coal per kwh to 1½ pounds of coal per kwh, and in many instances even

greater economy has been effected.

Twenty years of effort has done a great deal for illumination. Who remembers the "drops" scattered hit or miss around the plant, with clear glass shades, if any reflector was used at all. Four or five foot-candles was good going and 13 to 14 lumens per watt was just about all you could get out of a lamp bulb. Today, we have tailor-made lighting jobs with customers clamoring for 50, 75, even 100 foot-candles of illumination. The lighting engineer has RLM reflectors with several combinations of glassed steel diffusers to choose from. Cooper-Hewitts and high intensity mercury vapor lamps are available and par excellent for cer-



These curves indicate the improvements made in motors in the past twenty years. The curves are for a typical general-purpose squirrel cage motor.

tain types of work. In the last few months fluorescent lighting has come into being with an output of around forty-four lumens per watt. Prices on Mazda lamps are now only 40% of what they were twenty years ago, and the lamps are twelve per cent more efficient.

Twenty years ago a conduit wiring job was considered prohibitive and any engineer or architect recommending a conduit job was considered not properly looking after
(Continued on page 89)

The Utility's Contribution

To Twenty Years of Electrical Development in the South

By J. F. Owens

President, Oklahoma Gas and Electric Co., Oklahoma City

I AM glad to participate in this series of articles in the twentieth anniversary issue of this great trade magazine, THE ELECTRICAL SOUTH, and review with other writers some of the contributions of the electrical industry in the amazing development of the South during the past two decades. We of the electric operating companies serving this great section feel justified in taking pride in our contribution to these achievements.

Measured in ordinary terms, the electric industry is still a very young industry; therefore, those of us engaged in that industry regard many of the developments within the last two decades as pioneering achievements. Much of the technical pioneering was done by Mr. Edison and his faithful associates, but much of the pioneering of management came in the twenties. And although many profess to see only the abuses of this dec-

ade, those of us acquainted with the facts know that although the thirties may be characterized as a decade of governmental experiments, the twenties contributed much pioneering in the progress of electrical development in the South and the nation.

Those of us who are older in the industry can say that although the future is most important, the future is built upon the foundations of the past. The first World War clearly demonstrated the value of electric power in industry, and since then, we have come to realize the necessity of electric service in modern living. Our business is founded upon the bed-rock of public necessity which imposes upon management an obligation of trusteeship which I think management general-

ly recognizes. In these two decades of development, I think we have discovered that social and economic progress must be in harmony.

There are certain definite contributions of operating electric utilities to the philosophy of management which can be traced to this period which I should like to review at this time. The leaders of our industry in the South can rightfully claim their full share of these achievements.

In the first place, it was during the decade of the twenties that we developed the theory of the utility as a service organization. And although the first part of this decade was largely devoted to adding new customers to our lines, since that time we have been devoting our time to the increased use and value of our service. It was during this period that management became keenly aware that its responsibility extended beyond the electric meter



Duke Power Company's new Cliffside generating plant, typical of dozens of new plants just completed or under construction. This constant expansion of facilities to render

more and better service to its customers has characterized the electric utility industry. Electric power production in the South increased 400% in the past ten years.

—that it is part of our job to provide full and economical utilization of our service.

The development of the "home service" idea, which originated in the twenties, is only such an effort on the part of management to assist housewives in obtaining the maximum value from their electric service. Many companies now extend this service to farm customers through cooperation in farm home demonstrations and in individual home calls. This service is also available in cooperation with merchandise dealers in the demonstration and use of appliances.

Companies also recognize their responsibility to assist commercial and power customers to utilize most effectively and economically the current they purchase. Sales engineers specializing in commercial and industrial lighting, air conditioning, general industrial power applications, municipal water systems, street lighting, and the petroleum industry, are generally available for advice and counsel of

customers requesting such service. And while these services, which are all developments within the last two decades, are related to selling, they also represent a new sense of trusteeship in management which tries to give the customer full value for his patronage.

Expansion of Service

The twenties also ushered in a new cycle of development which brought our service to small communities and rural areas for the first time. And with this steady march of progress, villages and farms were furnished 24-hour reliable service—usually at greatly reduced rates.

These are not mere platitudes, but statements which have the full backing of facts. For example, taking our company which is typical, we find the following accomplishments from the standpoint of service improvements and reductions in rates during this early period:

(a) Local distribution systems were constructed in 85 communities

where no electric service had previously been furnished. Dependable transmission service was immediately made available to these 85 communities.

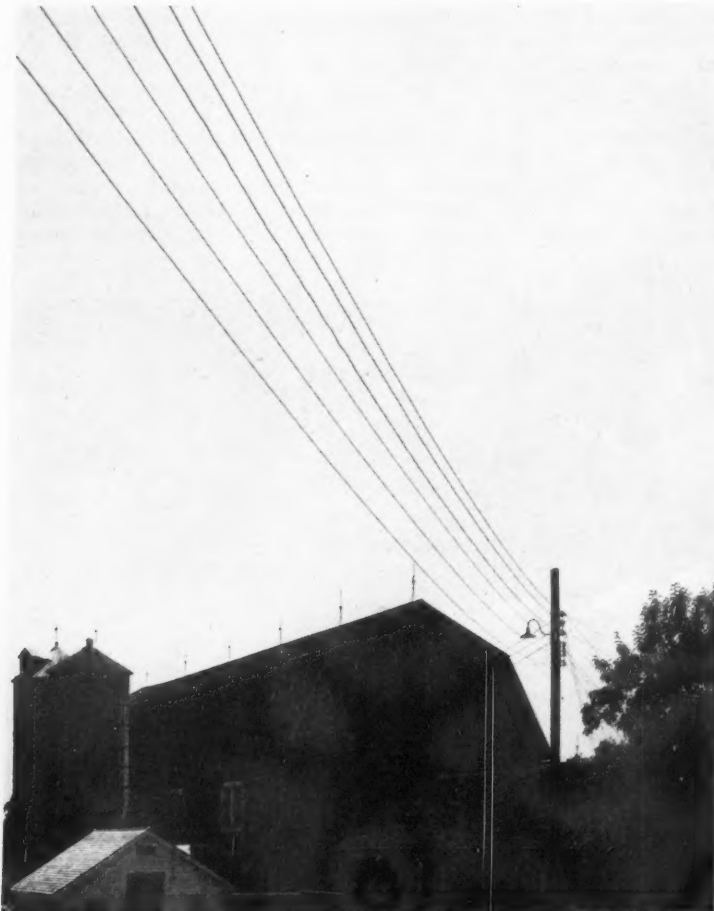
(b) Local distribution systems were purchased in 138 communities, some of which were receiving only limited hour service. Substantial rebuilds were required in 129 of these communities, and distribution systems were extended in 110 in order to provide more reliable service and make the service available to customers not previously served.

(c) Within the first year following the acquisition by purchase, domestic rates were reduced in 116 of the 138 communities. Eighty of these reductions ranged from 10% to 30% and 16 were in excess of 30%. Rates were further reduced in succeeding years.

And, in answer to the criticism that we have fallen down on our job in spreading the use of electricity, we need only recite some brief service facts. For example, in our own State of Oklahoma, 98% of the people living in incorporated communities have access to electric service. This includes even our smallest communities. Nearly 90% of this population is served exclusively by private interconnected systems. In addition, over 100 of our very small unincorporated communities in Oklahoma have electric service, all served, of course, by private companies. Our own company, for example, supplies electric service to 227 cities and towns in Oklahoma and western Arkansas. Of this far-flung service territory, only 50 communities are over 1,000 population, and only 25 are over 2,500 population. Therefore, by the Census Bureau's definitions, 90% of the communities we serve are rural.

The national picture is very similar. According to census figures, 99.7% of the total population in the United States, living in incorporated communities, large or small, have access to electric service, and practically 90% of this population is served exclusively by private interconnected systems. This is the achievement of the American electrical industry under the impetus of private initiative. It is not a governmental achievement. The contribution of government to this record is negligible. This achievement looms high in our national social and economic progress.

Although the extension of electric service to rural areas is discussed



in detail by another author in a separate section of this anniversary number, I wish to point out as strongly as I can that the pioneering in this field was not done by governmental agencies, but by private enterprise represented by operating utilities, many of whom are in the South. And while, of course, the government has stimulated rural electrification, and is entitled to its full share of the credit, the steady expansion of rural electrification may be traced to a combination of many important factors rather than to any one activity or condition. The improvement of farm income, lower construction costs, cheaper money rates, reductions in prices of appliances, lower electric rates, the educational work of agricultural schools and colleges, improvements in equipment, publicity campaigns, cooperation of farmers in securing right-of-ways, and REA publicity and promotion, all coupled with private initiative and pioneering have been constructive forces promoting rural extensions. This is the natural evolution of progress and no one group or agency can lay sole claim to this achievement.

Developments in Management

Aside from these more generally recognized developments, the stimulation of interest in the careful selection and training of personnel, safety work, and the decentralization of its investments through customer ownership, are all developments in management which can be traced largely to the past two decades. This period, therefore, made noteworthy contributions to the practices and philosophy of modern management.

Within very recent years, we have become more pension-conscious. But while this "security consciousness" has received great stimulation from the government, the idea surely did not originate with the depression. Our industry, perhaps because of its necessary function, is generally recognized as providing the most stable employment in industry. There is no greater security than the security of employment at a fair wage. However, as a part of management in a southern utility, I have long recognized that industry in general owes its workers more than a mere living—it owes them a sense of security. I definitely advocated this policy before the coming of national Social Security legislation. For instance, in 1932 in my address at Atlantic City,



as president of the N.E.L.A., I stated over strong opposition the following principles:

"Business must primarily recognize that when an individual is asked to dedicate his life to it, that business owes him something beyond a mere wage; it owes him a sense of security and the freedom from anxiety that may be caused by uncertainty of employment or incapacitation. This sense of security is not only good for the individual, but it is also good for business.

"We have learned from our recent trials that a business cannot prosper unless individuals prosper. People cannot purchase if they are not employed. It is the problem of American business to solve the question of unemployment. If it does not do so, government will attempt the solution with all the waste that accompanies any governmental undertaking; a waste and loss for which business must ultimately pay. Man has always been most concerned with the things farthest from him. His first study was that of the stars; the last about himself—sociology and economics.

"We set up depreciation reserves against the failure of ma-

terial things employed in our business. This is sound. Is there any reason then why the same means should not be employed to protect the human elements of our business—admittedly, more important?"

Recent years have clearly demonstrated the truth of this statement.

I must leave to others the presentation of the statistical record of our growth in the South during the past twenty years, but it should be common knowledge that the development of electricity has far outstripped population growth in America and in the South. The total population of the United States increased only 24% during the past two decades, but during this same period electric power production increased 240%, or at the ratio of 10 to 1. The South's population likewise increased 24% from 1930 to 1940, but its electric power production (exclusive of the T.V.A.) increased 400%, which is at the ratio of 17 to 1.

In spite of the inroads of subsidized federal projects within re-

(Continued on page 89)

Appliance Dealer Problems

After Twenty Years of Electrical Development in the South

By Emmett Terrell

President, Terrell Electric Company
Chattanooga, Tennessee.

TODAY, in 1941, the electrical appliance business can be described as interesting, profitable, and tricky. It is interesting and profitable if handled right; if not, it can be just tricky.

I can speak of the appliance business in the present and the future, judging these from the past, as one of the first, if not the very first, independent appliance dealers in Chattanooga. And I believe I can discuss the industry at large throughout the South, as the vivid history of the business in Chattanooga is typical of its development in the entire South. It may be that other dealers would like to read a roseate, enthusiastic and optimistic forecast for the field, but I can't make it. I believe, however, that I can paint a *true* picture, and that that picture will be encouraging to the right kind of dealer. I can say this, and back it with my own experience and with knowledge of other dealers' operations, that the appliance business is a money-maker, if all the hazards and factors are watched with care.

We can see what lies ahead, I think, by what has gone before. While I take my text from the record books of Chattanooga, it applies, with minor variations in the time element and degree, to practically all major cities of the South.

Looking back twenty years, we find one, and only one, firm engaged in the distribution of appliances. This was the electric utility company. The margin of profit on appliances, as such, in those days and under the conditions the utility operated, was relatively negligible to that corporation, and they sold appliances only as a means of increasing electrical consumption. Because of that small margin of profit, and because the high electrical rates at that time prevented the development of any great volume in the sale of appliances, the independent dealer just didn't exist. Ap-

pliances, particularly the major ones such as refrigerators and washers and ranges, were distinctly a luxury, rather than a common necessity and volume builder. In my observation, independent ventures in the retail appliance field were few and for the most part, ill-fated, due to these hazards.

About the beginning of the last decade, however, utilities began to adjust their rates and we saw our way clear to enter the retail field with a hope of profit. These hopes, aided by cooperation of the utility, materialized with increasing results up to 1936, in which year our turnover in appliances reached a record height. Power rates had continued to descend, appliances had continued to improve and become more gen-

erally attractive and useable, and sales continued to mount.

In the early days, the appliance field was an unknown quantity for the retailer, and I can remember only about four competitors aside from the utility, and the latter, because of its thorough cooperation, could hardly be called competition. Only a few furniture stores were selling ranges, refrigerators and water heaters at that time, and they were not aggressive. This almost complete absence of serious competition was a panacea never again to be seen by the independent dealer; at that time it had a great deal to do with our entry in the field, and was naturally a great contribution to the profitability of a dealership.

It would not be inconsistent to call that period, ranging from eight to eighteen years ago, varying with the locality, the "Golden Age" of



Good display is a fundamental requirement for a successful appliance business and this factor has not been neglected by the Terrell Electric Co., of Chattanooga. This model kitchen sells "use-value."

the appliance business. Consider the factors which made it so. Competition was almost absent. The market was almost untouched, sales of major appliances hitherto having been so few as to do no more than pave the way for a wide acceptance of them by the public. Manufacturers were getting their range on their production and distribution costs, so that list prices were no longer prohibitive, but were still high enough, and discounts long enough, to allow a liberal margin of profit for the dealer. Purchasers were just discovering that it was possible to use electricity economically in refrigeration, cooking, cleaning, heating and washing, due to lowered rates. So few appliances were in service, and had had the chance to become outmoded, that trade-in problems were unknown.

Selling appliances was not the tussle then that it is now. An aggressive salesman, by using his feet and head, could go out and sell a refrigerator almost when, where and as he pleased. He didn't have a dozen price-cutting competitors, and a broken down unit to take in trade.

Selling appliances then was a very active business, and a very profitable one, and consequently could not fail to attract new people to the field. In addition to this, there is another factor which few people take into account, which

swelled the ranks of appliance dealers. There was, about that time, what was known as a "depression." Among other things, this depression practically knocked building in the head for several years, and this left a good many electrical contractors with few places to pitch camp. It also made a hole in the volume of hardware and furniture stores. These firms, seeking some-

thing to replace the loss of business due to the slackening in building, logically selected the appliance field as the answer. The result: from one appliance dealer twenty years ago, and four ten years ago, there were about forty dealers in Chattanooga in 1940 handling appliances.

This increase in distribution outlets, plus the evolution worked by partial saturation of the market, changes in manufacturing, in buying preferences and in prices, has meant a changed picture entirely by the end of the current decade, which calls for changed evaluations, a changed outlook and changed methods.

When I estimate that there are forty appliance dealers in this city I include not only the relatively few independent 100% appliance firms, but electrical contractors who do a combination business, hardware stores, furniture stores, sheet metal concerns, and coal dealers, all of whom are regarded as legitimate outlets. To this list must now be added such businesses as filling stations, drug stores, department stores, tire stores, chain stores, and, so help me, bicycle shops, all of which are likely to blossom forth with an appliance line.

In today's picture there is also to be considered the great number of units which have been in service anywhere from five to fifteen years, any of which may pop up to present
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The effective arrangement of the Terrell appliance display floor is shown in this view. Note the modern fluorescent lighting and the small laundry display room at the left.



Small appliances are effectively exhibited on this island display stand. They require but little space, build up considerable store traffic, and contribute substantially to store overhead.

The Contractor's Viewpoint

On Twenty Years of Electrical Development in the South

By Roscoe E. Libecap

Libecap Electric Company
Dallas, Texas

MY HOBBY has always been experimenting and I suppose my greatest ambition has been to work in my laboratory with nothing else in particular to do but experiment and develop new and more economical methods of accomplishing things electrically. But unless you have an unlimited amount of capital, sooner or later this experimenting must be set aside for the more profitable end of the business—that of doing commercial electrical work. This necessity started the business I have today.

I couldn't begin to name the various projects on which I have worked since my inception in the business, but there is one job in the earlier years which seems to have impressed me more than some of the others—it was the county jail in Galveston, which was being rewired. We were locked in every day and let out each evening. During that time there was an attempted jail break, in which some of the prisoners used current of the lighting system and successfully burned through the bars—rather a unique method when you consider the circuit fuses were rated at not more than 30 amperes, and 15 ampere fuses were generally used.

Houston, then Dallas, were my next locations. I'll never forget how important I thought I was after working at the business for about a year. I had definitely concluded there was nothing more about the electrical business to be learned, and right there is where my real lessons in this business began.

After working with some of the older heads, I soon realized the more I worked and the more I learned, the less I seemed to know; and I can truthfully say that this seems to still apply, even after 25 years in the business. Every day something new and educational can be learned about electricity. Every

year new and improved machinery, with complicated hook-ups, is being designed; and there are being added to the electrical contractor's library, correspondingly new data, books, and whole volumes of information on new developments. But no matter how many books you accumulate and read, there will still be problems coming up for immediate solution for which there is no answer in the books, and a fellow has to do a little experimenting and figuring to get them solved.

Our work was very simple in those earlier years and a text book or two for reference constituted a man's library. Knob-and-tube wiring, open wire on the ceiling, with wood moulding work, was accepted as good safe practice.

The trend from direct current to single-phase alternating current for power and lights; then two-phase, and at last three-phase for power has been gradual, and although

Mr. Libecap has been a member of the American Institute of Electrical Engineers since 1923; he is also a member of the National Electrical Contractors Association, the National Industrial Service Association, the Dallas Electric Club, and the Northeast Dallas Lions Club, serving as Tail Twister and a director for three years. He is active in association, civic, club and community work.



Offices, estimating room, etc., of the Libecap Electric Co., of Dallas, are located in this neat residence-type building.

these newer sources of power had been known for a number of years, their use in the industry had been retarded, due to the number of changes necessary in the wiring and equipment. There was also the problem of educating the public in the use of these newer systems. Today, we have available the combination power and lighting distribution system, wherein three-phase power and lights may be used from the same set of transformers by the use of four wires and one meter, as compared with the previous set-up of six wires and two meters. This, in itself, when used universally, will represent a great saving in the industry.

Although conduit, greenfield, and flexible armored cable, commonly known as armored BX cable, were in use years ago and are still considered good wiring procedure, the use of wood moulding, which was widely used many years ago, has been prohibited by the National Code. Knob-and-tube wiring is still accepted, but is rapidly being replaced by non-metallic sheathed cable, which is much easier to install.

Some other direct comparisons of conditions today and those existing twenty years or so ago may be of interest to the reader. Whereas, in the old days, much work normally came to the well-known contractor, now aggressive solicitation is essential in getting business. This is due, no doubt, to the greater number of contractors in the field.

More knowledge is now necessary. A contractor should have a better



The estimating department shown here adjoins Mr. Libecap's office and affords complete privacy. Note the convenient arrangement.

knowledge of his customer's requirements than has the customer. The man who does have such knowledge is one jump ahead of competition, even though the other's price may be lower.

Development has been so fast that the industrial executive can hardly keep up with such progress as may relate to his own business. The answer is that such executive can keep in touch with electrical development through consultation with his electrical contractor. Industrial plant operators now realize that the installation of a better lighting sys-

tem may give them not only increased light intensity but provide a saving in current consumption.

Changes are rapidly taking place, with which the up-to-date contractor must keep pace. There are three ways to do this: through the trade papers, association meetings, and books, which can be used for reference as well as for study.

Operating conditions have changed in many respects during the past twenty years. More equipment is being used to make the work easier for the men and help keep labor costs at a low level. Actually, labor difficulties are probably no more complicated today than in the past. As long as there is the human element in any project, there will always be labor complications to some degree.

Closer competition than that of twenty years ago has made it necessary to be more accurate and positive as to labor and material costs, thus increasing overhead in this department.

When work is plentiful and there is a labor shortage there will always be a trend toward cost-plus work. Some contractors now are doing practically all cost-plus work, having a regular clientele, for whom they do all the work.

In the matter of estimating, we use the N.E.C.A. system, with our own labor units, and find it very convenient, and generally quite accurate. We believe this system, which bases labor on quantities of material installed, is more generally used than any other system, al-



Mr. Libecap's private office is effectively arranged and unusual in many respects. Part of his extensive technical library is shown.

though some contractors have their own systems.

In my opinion, it is not practical for a contractor to operate over a large area unless the work is of such nature that the contractor can keep his men on the job from the time it starts until it is finished. However, there are some electrical contractors who have been doing quite a bit of out-of-town work with good success, for this reason.

In our area skilled electricians are hard to get. It seems that many of the so-called electricians of today are working at the business for money alone and have no further ambition. Many of them have no pride in the work they turn out, being strictly clock-watchers, with no regard for the contractor and his possible profit or loss.

With government preparedness work reaching out for every type of skilled mechanic, and with high wage offers, there is no question but that there will be a shortage of skilled labor, especially among those contractors who do not get a large enough volume of business to enable them to maintain a continuous organization of skilled mechanics on full time.

There is a great need for a proper apprentice-training plan, and such a plan should be supported by the contractors, as well as by the unions. Usually an apprentice has to learn on the construction job or in the shop, with no educational background. He should be sent to school to learn the fundamental principles of electricity and gradually trained along the lines he is to work until



Corner of the general office, the first room at the front of the Libecap headquarters, which houses the general office staff.

he is ready to go on the job and get his practical training. He should be taught that there is something more to the electrical contracting business than merely attempting to make money.

While wiring methods have been improved during the past twenty years, it is questionable whether such improvement has aided the contractor monetarily. It certainly has helped to lower the installation cost to the consumer, particularly where method and material quality were of little or no consequence. Occasionally, the various methods of wiring do help out on a particular

job. However, they complicate matters by forcing the contractor to carry larger stocks and also to train his men in the use of the various classes of materials.

My suggestion would be that a standard be set up for electrical material with parts interchangeable and as few methods used as possible. This would enable the contractor to carry much less stock than at present.

There has been a suggestion that the National Electrical Code be arranged to separate rural from urban wiring. There is no doubt that should this be done, the contractor would be in a better position to be competitive in his bidding on rural and out-lying community work.

One development that is noteworthy is the increased cooperation between utilities and independents. In our locality, the utility company and the electrical contractors are working closer together than at any time during the past twenty years. Their sponsoring of such programs as the better light-better sight campaign has done much to increase business for the contractor as well as to benefit the public. There are some who contend that utility cooperation has a tendency to foster the so-called curbstoners. I think not. We have always had curbstoners and probably always will; at least, until there are laws passed and enforced requiring the curbstoners to maintain a legitimate place of business, thereby making them better competitors through

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This portable field office operated by the Libecap Company contains office records and blueprints as well as special tools.

Trends in Wholesaling

During Twenty Years of Electrical Development in the South

TWENTY YEARS is a long time in the electrical supply wholesaling industry. Any industry barely three-quarters of a century old cannot have escaped important changes in any two consecutive decades of its lifetime, and the electrical business is no exception. But reminiscing is such a definite indication of old age that the more mature readers of this publication are apt to feel some resentment if it is taken for granted that they will be interested in any discussion of the developments of the past twenty years.

Speculation over the possibilities of the next twenty constitutes a more exciting pastime. But predictions and prognostications aren't often made with any degree of accuracy except with the aid of knowl-

By G. T. Marchmont

Southern District Manager
Graybar Electric Co., Inc.,
Atlanta, Ga.

edge and experience based upon events of the past, so maybe it isn't amiss to say a few words about an era that began when the boys came home after one war and ended when they began to leave home to prepare to defend the nation against any possible aggressor who might feel disposed to engage us in a new one.

When ELECTRICAL SOUTH made its bow twenty years ago, the wholesaler of electrical supplies and equipment had just emerged from a period that had provided an excellent opportunity for him to prove his right to an important place in the distribution picture. Business

had been good for a year or two before we got into the war, and got still better when we began to devote all our energies to the mobilization, equipping, and training of an army and a navy. Sales reached the peak in the "silk shirt" era of nineteen nineteen and early nineteen twenty. Our transportation system, as good as it was, became so congested in certain strategic points that long delays were not unusual and the wholesalers' stocks were valuable assets in every community. The advocates of the "elimination of the middleman" were silenced.

Then followed an economic change so abrupt that it was almost disastrous. One day capacity production, swollen inventories, inflated prices; the next, buyers' strikes. A manufacturer in New York, in



Modern lighting is more than a catalog number to Mr. Marchmont's salesmen. This view of the general offices of the Atlanta branch of Graybar Electric Company shows to good advantage the effective fluorescent lighting.

Pittsburgh, in Chicago, who had valued his distributor because of his warehousing facilities found that he needed him more than ever. Not that transportation was any longer difficult—it wasn't; but the manufacturer just couldn't afford to travel the length and breadth of the land on the meagre profits of the small volume of highly competitive business available. The wholesaler, with his local selling organization, his credit and collection department, and his knowledge of each customer's own peculiar financial condition, was as great an asset to the manufacturer and to the buyer as in the boom days!

That was twenty years ago. Since that day an occasional reformer has charged the wholesaler with being an unnecessary evil in the scheme of distribution; but the buyer, be he purchasing agent of a big utility or industrial plant, or the proprietor of a one-man shop, has found throughout these twenty years that the electrical wholesaler serves a useful purpose and is worthy of his hire.

Growth of Wholesaling

A statistical record of the growth of the electrical wholesaling industry in these twenty years shows some interesting figures. In the states of the Southland in which ELECTRICAL SOUTH enjoys its greatest circulation, the number of wholesalers has increased greatly. One large nation-wide distributor of the early twenties now has more than double the number of Southern branches. The National Electrical Wholesalers Association in nineteen twenty had seventeen member companies in the Southern states having a total of thirty-four houses. Today, from this same area, there are twenty-eight members with one hundred and twenty-three houses.

Although the growth of the wholesale electrical business has been almost phenomenal, it didn't "just happen." There was some planning back of it—planning on the part of the entire industry. The manufacturers had the vision and kept constantly alert developing new products, better products, at lower prices. The electric light and power companies have year after year been making electric service more easily obtainable and less costly to the user.

"Rural electrification" is not a new term. Twenty years ago the utilities were not only talking rural electrification, they were doing something about it. The writer of



Every branch of the industry has contributed to its remarkable progress in the past twenty years. Dealers have arranged elaborate show room displays such as this to build up public acceptance.

this article has to travel less than fifteen minutes by automobile or inter-urban trolley to enter into the territories served by the first rural lines in his particular locality—the lines built by the Georgia Power Company a quarter of a century ago, radiating from Atlanta to Smyrna, to Stone Mountain, and elsewhere, and serving rural customers in several counties.

The electrical contractor has done his share by the adoption of greatly improved wiring standards. The workmanship displayed today in electrical construction is as far superior to that of twenty years ago as is the quality of the product with which the wireman and the lineman have to work. Architects and engineers, once considering the electrical part of a building job as almost incidental, are today employing the best specialized talent available to make certain that the electrical specifications are right up to the minute with respect to convenience, completeness, and economy of operation. Dealers in electrical appliances have arranged elaborate show rooms and have provided service departments so well equipped as to eliminate almost completely the inconvenience that once accompanied the use of many complicated appliances.

However, with all this help from others in the industry, the pathway of the electrical wholesaler isn't always strewn with roses. His problems are many—difficult enough and sufficiently varied to keep him constantly on his toes. Through

the National Electrical Wholesalers Association he has the opportunity to learn of improved business methods. Outstanding activities of the association during the past twenty years have included studies of operating expenses by commodities, a plan of standardizing and combining catalog purchases resulting in considerable economy, institution of a constructive correspondence course for salesmen, and a study of distribution costs in cooperation with the United States Department of Commerce. Ten years ago the Association was authorized to hold a Trade Practice Conference, with the resultant adoption two years later of a set of rules and the creation of a Permanent Committee on Trade Practices. Through an Advisory Committee on Wholesale Distribution, the N.E.W.A. is now co-operating with the National Defense Advisory Commission. But not all the members of the industry are members of the Association, so the other medium of exchange of ideas is the trade paper, and no industry in the land is represented by a more versatile and more carefully edited group of trade magazines than is the electrical industry. National and sectional, they serve a need that can be supplied in no other way.

An industry that has shown so much progress in such a short space of time has every right to view the future with unbounded enthusiasm, mingled with some curiosity! The years to come should bring good
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Progress in Wiring Practice And Electrical Design

By Victor H. Tousley

Electrical Field Engineer
National Fire Protection Association
Chicago, Illinois

TO DISCUSS twenty years of electrical progress and not include progress in the wiring field, would be to omit from the general picture one of the most outstanding elements of real electrical progress. As we are all well aware, the field of electrical application has been one of steady growth since the first arc lamp replaced one of oil or gas, and since the first series motor opened up the field of power application. Of late years, however, this advancement has been one of leaps and bounds, and the twenty years that have just passed represent a development heretofore undreamed of.

This development has embraced every branch of the electrical industry, and each branch, reacting on the other, has been a spur which has tended to accelerate the rate of progress. The manufacturer of electrical apparatus has improved his product, and as a result has enabled the current-producing group to generate more electric current, more efficiently and more economically. With greater production facilities the utility has endeavored to expand its field, and in doing so has still further increased the demands on the manufacturer.

Likewise there has been an awakening on the part of the installer of electrical equipment. The electrical contractor has come to realize that he has a service to sell, and with each sale of the electrical contractor's service, the field of electrical application for all other groups of the electrical industry has been extended. There has also been an awakening on the part of the electrical journeyman, and an appreciation of the fact that he has an important part to play in the growth in the use of electricity.

Primitive Home Wiring

The electrical equipment of the ordinary home that was wired twenty years ago would be considered primitive in the light of present day needs. Twenty years ago the people had not learned to use electricity, and even though they were willing to learn they were handi-

capped by the lack of facilities and the cost of bringing current to the equipment.

To promote the demands of the current-using public has presented a difficult situation. As in any other line of business, the individual had to be acquainted with the possibilities in the electrical field. He has had to be shown that electric light is a safer method of illumination; that light itself, by illuminating the dark passageway and the stairs and corners of the house, would largely reduce the over-expanding field of household accidents. He has had to be shown the value of sight and the important position that illumination occupies in the saving of eyes. He has had

to be shown that the value and satisfaction that comes from reading and study are immensely increased by proper illumination. The possibilities of the decorative effects of electrical illumination had to be sold to the housewife.

And the same progress has been necessary in the use of electricity for heat and power. The fact that one can cook better and quicker on an electric range and with less waste of heat to raise the already high temperature of a kitchen on a warm summer day, was not well known to the housewife of twenty years ago. Neither had the value of the bathroom heater or the good looking portable heaters been thoroughly demonstrated.

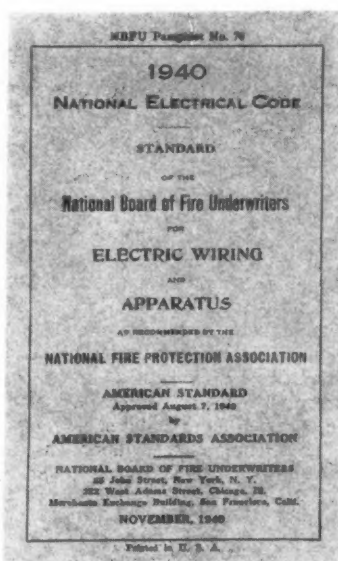
The hundreds of power-operated appliances now in common use such as the refrigerator, the vacuum cleaner, the stoker, the oil-burner, the electric clock, the dishwasher, the washing machine, the mangle, and the numerous other appliances that do so much to lessen the burden and to increase the efficiency of the household tasks, were not well known.

Industrial Progress

This situation was not confined to the uses of electricity in the home. The industrial plant managers had to learn the value of light in the matter of production. The 60-watt drop light shining in the eyes of the man at a lathe, has been replaced by a general illumination that not only increases the speed of production but makes for better and safer operation.

Neither is the owner of a store on the main street content with a few drop lights in his store and in his show window with these lights turned on toward evening or when it became dark, but this individual now recognizes the value of light in improving his sales. He now has a flood of illumination in use from the time his store opens in the morning until it closes at night.

The electrical industry realized the situation and the need for some action if this broad field of electrical use was to be made available, and did something about it. Every



The National Electrical Code reflects development in the wiring field more accurately than any other record. One has only to compare the Code of 1940 with that of 1920 to indicate the advances that have taken place in twenty years. Many of these advances are discussed by Mr. Tousley in the accompanying article.

effort was made in the way of research, education, promotion, more acceptable design, to encourage the citizen to take advantage of the possibilities in the use of electric current.

But the advancement in this electrical utilization field was stopped by the bottleneck of interior wiring, and no matter how well sold the individual was on the desirability of using more electric current, he could do little or nothing about it with his limited outlets, his limited branch circuits, and his limited mains and services.

Campaigns Effective

These campaigns began to take effect, however, and when the occupant of the apartment house came to look for a new apartment, he examined closely the electrical provisions, and if they were insufficient, the owner or agent heard the complaint and possibly lost a future tenant. In the same manner, the buyer of a house gave close attention to the electrical facilities. As a result the builder of an apartment building, or of a home, came to learn that to be considered as modern the electrical equipment must meet the present-day standard. This demand has not been confined to new buildings, but has been extended to the rewiring or additions to the wiring of existing buildings.

The Red Seal Plan; Better Light-Better Sight; the refrigerator campaigns; the range and water heater campaigns; and now the Adequate Wiring campaigns, have all had their effect in the building of dwellings. They have proper fixed lighting, a sufficient number of receptacle outlets so located as to make electric current available wherever and whenever needed, convenient switching, outlets for electrical refrigeration, cooking, and water heating. The dwellings also have a sufficient number of branch circuits and sufficiently large mains and service conductors to safely carry the maximum demand in current without a needless and uneconomical loss of voltage.

The National Electrical Code probably reflects the last twenty years' development in the wiring field more accurately than any other record, but even the code itself has in this period passed through a definite stage of development. Many years ago the National Electrical Code was looked upon somewhat as a "guide" to safe electrical construction. It was not considered such a serious matter if compliance

to it was not 100 per cent. With the more general adoption of the code as a state or municipal law, however, it came to be more strictly applied and enforced.

The code moved forward in another way also, in that instead of following the trend in electrical progress and waiting for a new development to gain some recognition in the field before including in the code proper rules for its installation, provision is made so that recognition of these new methods or materials can be given prior to their installation in buildings.

Although the National Electrical Code is primarily a device for obtaining electrical installations that are safe to persons and property, it supplies an engineering service that has had much to do with the last twenty years' improvement in wiring. It has been a practice for years—and a practice that still continues and will for years to come—to accept as the only evidence of a satisfactory electrical installation the certificate of inspection issued by the electrical inspector. The application of this code and the issuance of this certificate, indicates to a reasonable extent that the particular installation has a sufficient number of circuits for normal use and a sufficient number of receptacle outlets so that unnecessarily long runs of flexible cord will not be needed. The application of the code is also an indication that the mains and the service have sufficient capacity to carry any load that is liable to be imposed upon them.

Marked Effect of Code

These characteristics of the code in the twenty years just passed, have had a marked effect. The present wiring adequacy as obtained from code compliance, although far from what could be considered as desirable, has gone a long way in providing for the wants of the current-using public.

Some comparisons between the National Electrical Code of 1920 and the code of 1940, will serve to indicate the advances that have taken place in wiring.

In 1920 the code accepted a service wire of No. 12. The present code requires at least No. 8, and in many territories No. 6 is the smallest main conductor accepted.

In 1920, the branch lighting circuit was limited to 660 watts with not more than 16 medium-base sockets on a circuit. The 1940 code permits 15 amperes on a circuit,

and in the case of residences and some other locations places no limit on the number of sockets or receptacles on the circuit.

There was no requirement of any kind for receptacles in the 1920 code, in fact there were not many of these installed on the original wiring. The 1940 code requires that receptacles be provided in all the living rooms of the house. The 1940 code further provides that these receptacles be of sufficient number and so located that no point along a baseboard will be more than 10 feet distance from a receptacle.

Neither did the 1920 code require any special circuit for the heavy loaded receptacles in the kitchen, dining room, pantry, breakfast room, and laundry. The 1940 code requires a circuit of No. 12 wire for receptacles in these rooms and permits this circuit to be loaded to 20 amperes.

Change in Emphasis

The arrangement of the 1920 code gives evidence of the changes that have occurred in electrical wiring in the last twenty years. The first subject covered in the 1920 code was generators. Generators were of considerable importance in the days when electric current came into prominence, as many buildings had their own electrical plants. With the expansion of the utility field and the advantages of central station current, the isolated generating plant is now rare and the code rules are few in number and occupy a minor place in the present codes.

Switchboards, resistors, lightning arresters, and storage batteries occupied the place of honor in the 1920 code, and wiring as we now think of it followed after these, at that time, important subjects.

Conductors and their insulations have shown a marked progress. So far as the code is concerned there was one type of wire in general use: the code-grade rubber-covered wire. Although there were other types of wire such as weatherproof, slow-burning, varnished cambric, etc., these had special uses. The greatest development in wires has taken place in recent years, and the 1940 code recognizes eighteen types of wire insulation.

If size can be taken as an evidence of growth, the 1940 code is outstanding as it contains approximately two and one-half times as much material as the 1920 code.

Progress has not been made alone in ordinary building wiring, but

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"FETCHIN' CHRISTMUS IN DE KITCHEN"

The story of electrical appliance development

By W. F. Ogden

Commercial Engineer, Edison
General Electric Appliance
Company, Inc., Chicago

"SLEEPIN' in de fence cornder, don't fetch Christmus in de kitchen," is the plantation proverb from "Uncle Remus," by Joel Chandler Harris. Probably this was Uncle Remus' way of saying, "Slothfulness casteth into a deep sleep and the idle soul shall suffer hunger." (Proverbs 19:15).

Anyone the least bit familiar with our industry knows full well there has been ceaseless, wide-awake, aggressive work going on for years "fetchin' Christmus in de kitchen"—fetchin' it for consumers of electricity, the men and women of the industry and the business concerns that make it up.

When one looks back he pauses. If the pause gives inspiration for the job ahead, it's pardonable. We

may then measure our progress by comparisons. Edison developed the first practical filament lamp in 1878. Electricity was unknown to the laity in 1880. Chicago installed the first steam turbine in 1903. It wasn't until 1907 that Coolidge's tungsten filament lamp was commercially introduced. By 1918, 6,000,000 or so families used electricity and averaged 272 kilowatt-hours use per year. Today, some 25,500,000 homes average over 950 kilowatt-hours use per home per year.

When ELECTRICAL SOUTH first went to press in 1921, the records show there were about 7,600,000 wired homes in the United States. Toasters were in 12½% of them; heaters in 10%; grills in 1¼%; hand irons in 70%. The grill was heralded as an "educator for electric cooking." Portable electric fans were popular, and busy, in the South, but their saturation apparently was insignificant.

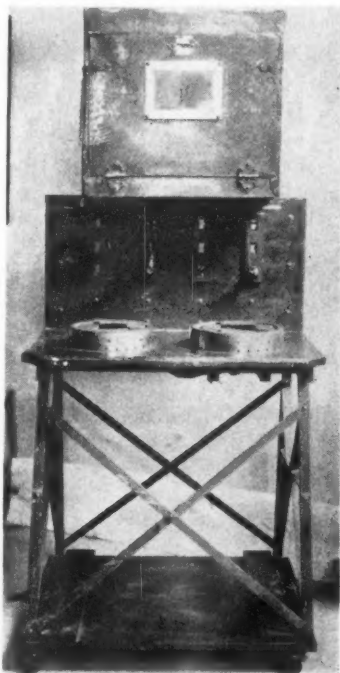
It appears unnecessary to describe in detail here the changes in styling and performance which twenty years of ceaseless work has brought to the small table-type appliances. We know the recent models well, from the bottle warmer to the electric shaver. We know the important place each holds, not only in better living, but in profits accrued.

On one of the first electric ranges (see illustration) the cooking surface and back wall were made of marble. The "three-heat switches" on the marble back consisted of three receptacles and a plug. Its oven had insulation, two units, and door provided with a glass window. The range shown is reported to have been in actual use for 19 years.

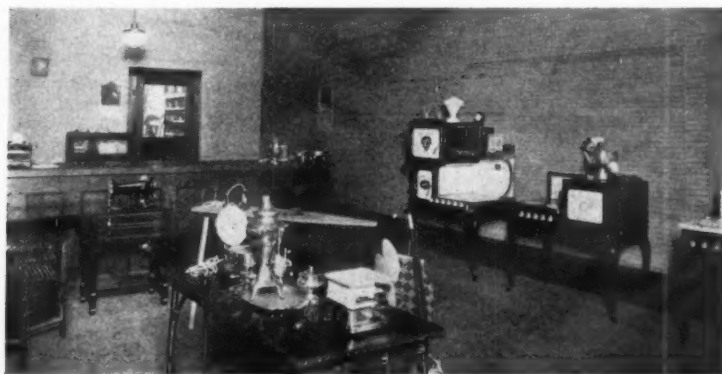
In 1909, George A. Hughes took advantage of a development in nickel-chromium resistance material. A true pioneer, he departed radically from all known practices in the use of such material. He exposed the wire so that the glowing heat came directly in contact with the cooking utensil. Heat could be seen! In that year he built the first, really practical electric range in a Chicago basement on South Dearborn Street. (See illustration). It created widespread interest among electrical men attending the N.E.L.A. convention at St. Louis in 1910. Salesmanship, engineering and inventive talents, as well as courage and foresight were required in such a venture.

One popular type of surface unit (about 1916) had exposed resistance wire. It was relatively light in weight, rated 800 watts and was, according to a published statement, "46.7% efficient requiring fourteen minutes to heat one quart of water from 70 F to 210 F in an aluminum dish." The equivalent efficiency of other surface units then available varied downward to as low as 23.7%.

About 1918 a 120-volt, 1400-watt,



This merchandise display in the Alabama Power Company's Albertville office is typical of the early twenties. Ranges are prominent. Even at this time, 1925, however, electric ranges as a business had been "in the picture" for years. The oddity above, one of the first electric ranges, was built in 1904.



6-inch spiral coil "Calrod type" of unit was developed. (See illustration). Note how the coils lifted out of the pan, the connection plug and the combination reflector and spillage shield. That was 23 years ago!

The 1941 Calrod units are better than 70% efficient, and will bring one quart of water from 60 F to 212 F on the 1250-watt size in less than 7½ minutes. Compare this with the average efficiency of approximately 24% found in units of 1918. That's an engineering achievement!

Profit possibilities of electric ranges were a popular subject as early as 1915. Far-seeing utility management was studying and reporting favorably on the profitable load-building characteristics of this



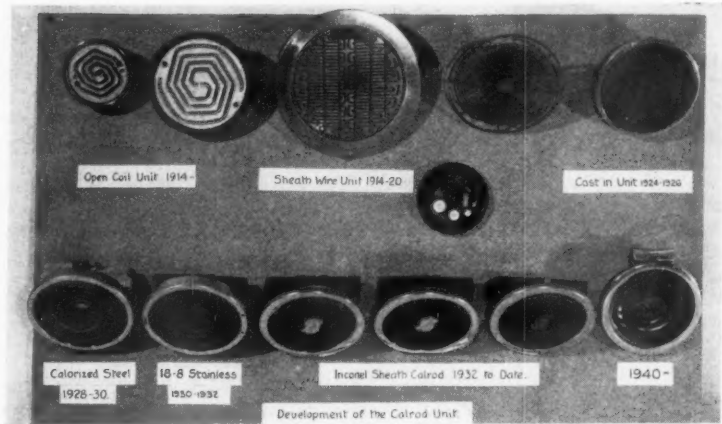
This is the electric range built by George Hughes in 1909-1910. To get public acceptance, he said, "It's got to look like a stove."

type of equipment. They urged active merchandising by their companies in effect to "fetch Christmas in de kitchen" for consumer and producer alike. To them, and to the electrical press, the leagues and the associations of that day, goes much of the credit for today's progress.

Early ranges were slow but they were safe, cool, clean, convenient, relatively efficient compared to non-electric ranges, and gave better results. They were associated with progress. The big job was to convince the public.

On the manufacturing side of the record men were working, promoting a better way to cook, a way to maintain the utilities' net return, a way to make ranges easier to sell.

Possibly you've wondered what consideration an engineer must face



Various stages in the development of a modern surface type heating element are shown above. The latest unit of this type is 70% efficient and will heat a quart of water from 60 F to 212 F in less than 7½ seconds. The average efficiency of such units twenty years ago was 24%.

each year as he plans next year's improved models. Use the range as an example:

First, *appearance*. How can we improve the lines and styling? "It's got to look like a stove," says Mr. Hughes, and he's right. The first automobiles had to look like carriages. Are gadgets and gingerbread really necessary? What useful features can be added? How important to easy selling is all that?

Second, *cooking performance*. Would simplification help? By all means! Every housewife wants assurance of perfect results every time! What, then, can we do to insure better food products from the surface units? The Thrift Cooker and the oven? "Automatic" is a compelling word in the salesman's book! But are we carrying the public too fast now, with all

these modern cooking improvements? Not if we overcome careless use by easy means. Make it easy to cook better! Let's remember, housewives' habits don't change with a mere wish of an engineer.

Third, *technical performance*. How can we improve efficiency and lower monthly bills or add useful energy consuming features? Utilities as well as consumers appreciate that approach. "Use more to save more" expresses the thought! What cooking operations need speeding up? Is more speed essential or is it too fast now? What is greater efficiency really worth?

Fourth, *quality*. What parts need quality improvement? How can we make it easier to see the difference in quality? Easier to sell such quality over competition?

Fifth, *load characteristics*. Utili-

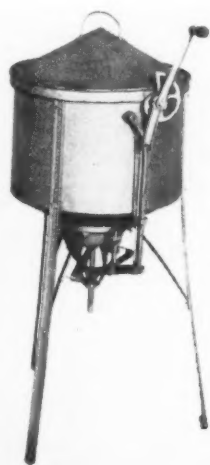


Typical of today's electric ranges are these outstanding models—products developed by the engineers' rule, "Never make it cheaper unless you make it better."

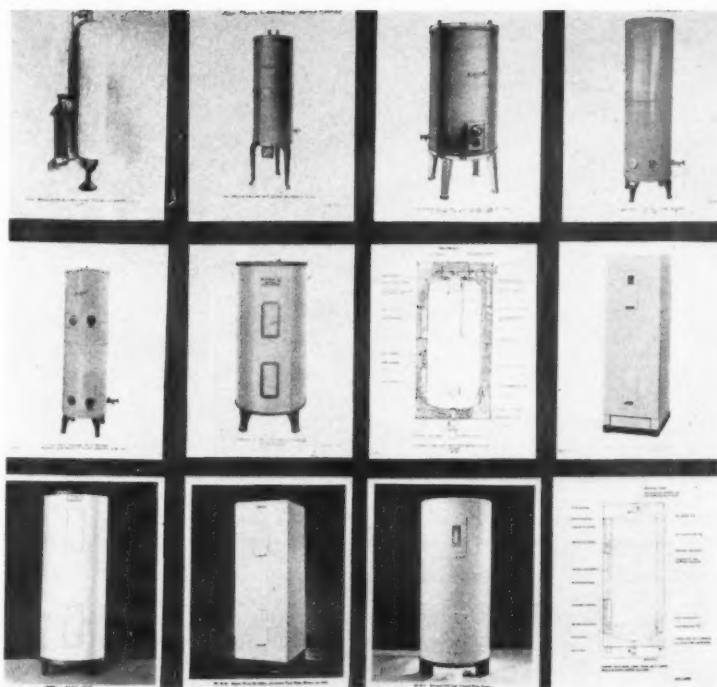
ties count on ranges and water heaters to offset both rate reductions and increasing expenses. Wherein can appliance load characteristics be improved? A speedier, more efficient Calrod, with economical low heats did the trick! Modern range demands are lower. Rates and load characteristics go along hand in hand to maintain the utilities' net return. There is no question about it. Utility management must be enthusiastic in wanting the added load. Their engineers and rate men lay the foundation on which this business is built. Let's never forget it.

And what about the sixth consideration, *cost to produce*? A lower price by itself won't sell appliances. We know that, but a low price is an important sales tool. Setting the price of the complete package is not the engineer's job, but what part will volume and standardization play in reducing the production cost? How can new materials, new tools and factory management help? Remember our Chief Engineer J. C. Sharp's rule, "Never make it cheaper unless you make it better."

The Northwest Electric Light and Power Association committee report of 1922 covered the subject "Ranges and Water Heaters" and suggested that "the electric wiring for water heaters be installed by the central stations without charge to the consumer . . . the use of electric water heaters is almost demanded with the use of electric ranges, the cost of operation being about the same for gas at \$1 and



More than three guesses would be required to name the function of this long legged contraption. It is one of the first domestic dishwashers—hand operated.



Here are some steps in the evolution of the modern electric water heater. Models in use in the early twenties were generally operated on "flat rates" and the waste heat was appalling. Modern storage types, well insulated, and employing immersed units, rapidly gained popularity, and an intelligent industry program is promoting public acceptance.

electricity at 0.8 of a cent . . . the successful development of electric cooking is dependent upon some satisfactory solution of the water heating problem. This problem, however, is fraught with no little difficulty . . ." There was a challenge!

Electric water heaters in use at that time were generally operated on "flat rates" and were estimated to use 7200 kwh per year. The waste heat was appalling. The majority were poorly insulated and equipped with strap-on type of heating units. It was not long before the circulation type, providing quicker recovery and higher thermal efficiencies, became popular.

The household storage type, well insulated and employing immersed units, rapidly gained popularity. The two-unit, low-wattage type answered many problems and now nationally it outsells all others. The value of controlling the water heater load, so as to prevent its demand from adding to the cooking peaks, was clearly brought out by early tests in Oregon homes. In electric water heating, probably more schemes related to methods of operation and ideas affecting the design of the heaters have been tried

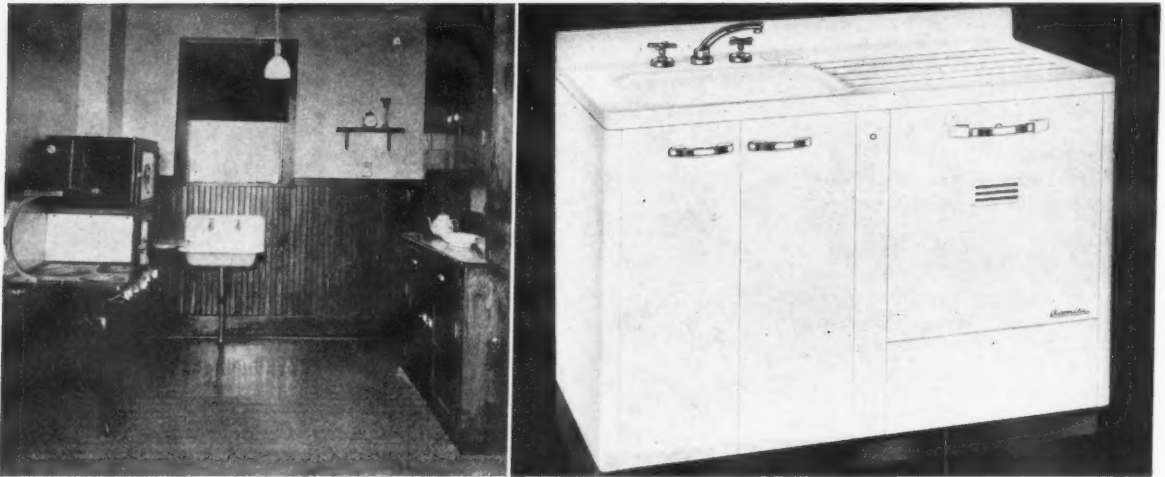
than in any other field of applying electricity to residential use.

Fortunately, as we look ahead, an industry program spells *progress* for electric water heating. This program is based on standards—principally standard wattages for heating units and their use. Other points of standardization are less important just now, yet the full program is rapidly gaining support.

Engineers see no reason why water heater production costs, through standardization, should not follow the same pattern of cost reductions that electric ranges, for example, have followed. The new range is better in every way because of volume sales, standardization, sound engineering and modern manufacturing facilities, all of which are equally open to water heaters.

Looking back we see sharp reductions in water heater prices from 1930 to 1935, followed by a leveling-off process from 1935 to 1940. The market increased from some 4,000,000 to 14,000,000 domestic meters with satisfactory rates, but the increase in models and catalog numbers accompanying the growth of the market retarded the downward price trend.

Standardization centralizes in-



This Florida kitchen was modern in 1920 but it is far removed from the kitchens of today that boast electric sinks such as shown at the right. It contains an automatic dishwasher as well as a waste disposal unit.

vestment. Scattered investment increases costs. So there we have the answer. Besides cost reduction, this industry program promises standardized sales stories with fewer technicalities impeding sales. That will make it easier. It promises standardized installation methods, providing more efficient hot water service. That will help; as will standardized methods of operating heaters among the majority of utilities.

The kwh used per water heater per year may be expected to increase. Like necessity for higher levels of illumination—more foot-candles to make seeing easier—the necessity for more gallons of 150 F. water (not 120 F.) is required to live electrically. Automatic appliances using hot water do better jobs than hand methods. They use hotter water than hands can stand and more of it. Not only are efficient installations important now,

but so are methods of operation, adequate tank sizes, 150 F. thermostat settings and high monthly efficiency or overall quality of the water heater.

Hot water is closely related to the job of washing dishes and clothes. What has electricity done for these household tasks?

The idea of washing dishes mechanically was conceived over a quarter of a century ago. Brothers W. R. and F. A. Walker of Syracuse, New York, built the first domestic dishwasher between the years 1907 and 1909. By early standards, it did a good job. Not until the 1913 New York World's Fair was electricity applied to the dishwasher. Following a struggle to obtain materials during the World War—aggravated by the fact that dishwashers were classed as "luxury appliances"—the 1919 dishwasher was dolled up. It was painted. Appearance of previous models

had impeded sales. Competition mushroomed but was short-lived.

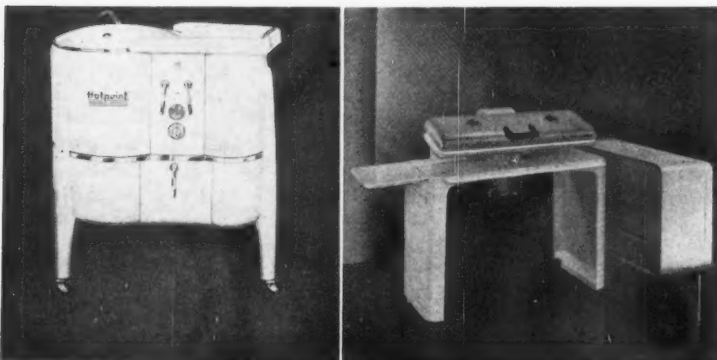
In 1925 work began on a better combination sink and dishwasher. By 1927 radical changes had resulted from an amount of experimental work impossible to properly tell about here. The basic design then employed a vertically mounted motor with directly attached agitator and simplified mechanism. This design remains today, basically the same as it was then.

In 1930 the Walker Dishwasher, along with pioneer F. A. Walker, became associated with Hotpoint's engineering staff. These engineers set to work developing the electric dishwasher as we know it today. Proper washing detergents were perfected and today are vital to satisfactory performance.

Revised editions of Mother Goose might print,

When I was a little girl,
I washed my mammy's dishes;
Now I am a big girl,
I just touch electric switches.

The modern electric sink (see illustration) contains means for disposing of kitchen wastes. Its new dishwasher is fully automatic, right up through the drying cycle to the time of cut-off. A push of one small button takes over the dishwashing and drying job. This appliance relieves the housewife of more manual labor than any other machine known today! It's a *real* load builder. It uses an 800-watt, Calrod heating unit for drying, and more hot water than the dishpan. Consider the load-building advantage of *that!* Therein lies a sales job attractive to utilities. This is one appliance that surely "fetches



Attractiveness and efficiency go hand-in-hand in modern household appliances typified by the spinner washer and electric ironer above.

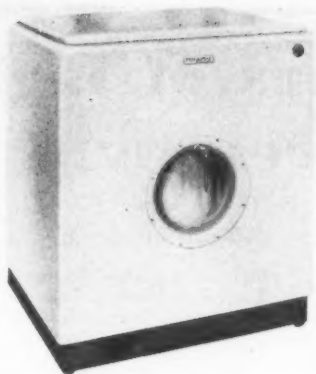
Christmus in de kitchen."

As for clothes washers, compare the model advertised in 1921 with those you are familiar with today—wringer models, spinner models and automatics! Compare their plus features in washing efficiency, convenience, safety, and long life.

Ironers have changed as have these other appliances. The advancement made in use value and performance has been no less startling.

Today's progress in electric appliance development is more rapid than it was twenty years ago. While the electric clothes drier, first introduced in 1940, was then considered the ultimate development in electric home laundry equipment, its installation was limited to homes with 230-volt service. Now—just one year later, an additional electric clothes drier has been added to this line which may be operated from a 115-volt outlet.

To the electric refrigerator should go high honor, not for starting the parade, but certainly for the advancement this appliance has made. There's no slothfulness evident here, yet some may have gone hungry. In July, 1923, a trade paper reported, "More than \$60,000,000 has been spent by developers of household machines." Even if that's an exaggeration it prompts serious thought. The job was under way.



Newest additions to home laundry lines are electric clothes driers which make home laundry operations independent of the weather. The model at the left was introduced in 1940 and operates on 230 volts. At right, a 1941 model clothes drier—operates from any 115-volt circuit.

Just as the red glow of hot wires made it easier to sell electric ranges, a few cubes of ice made it easier to sell refrigerators. Some manufacturers installed their machines in old ice chests. This was not selling a package but it reduced the advertised price. They all looked like ice boxes.

Noises, stuffing boxes, belts and refrigerants were sources of complaint. Some manufacturers felt five service calls during the first year were necessary. Others said two. This was a time when list prices, interest, and depreciation charges were greater than cost of

electricity, so low first cost, to the engineer, was more important than high efficiency. In October, 1922, it was stated, "There are 12 sanitary refrigerator machines which have been in successful operation for at least 12 consecutive months." So there were twelve makes on the market and others in the making.

One manufacturer had 4, 9, and 15 cubic foot models. The 9 cubic foot sold for \$595, F.O.B. factory. It probably took another \$30 to pipe and wire it in. It was water cooled for best efficiency. This was typical. Another manufacturer adver-

(Continued on page 76)



A triumph in electric kitchen planning that would gladden the heart of any housewife!

Twenty Years of Lighting Progress and Achievement

By Harold M. Horton

Division Lighting Engineer
Lamp Department, General
Electric Co., Atlanta

DURING the past twenty years many more lighting developments, of far reaching and signal importance, took place than within the preceding forty years. Up until that time, artificial lighting, in the majority of cases, was used simply to dispel mere darkness, and to provide just enough light to get-around-by.

However, many invaluable lessons were learned, from the experience of engineers, in the application of lighting to industry for such national programs as the speeding up of production, the protection of property from sabotage, and as a part of many other measures again so significantly familiar today.

During that post World War period, which also marked the time when the first attempts were being made at radio broadcasting and the first airplane mail service was established between New York and San Francisco, the truth was established, beyond any shadow of doubt, that higher levels of illumination were decidedly beneficial to the human being, both from the standpoint of improving his morale or mental outlook, as well as serving as a means for the individual to better the quality of his work or occupation, and to perform these tasks more rapidly, and under vastly greater degrees of comfort.

For instance, it was discovered

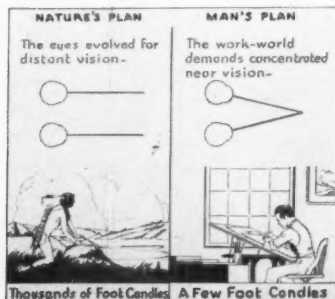
that the average level of illumination within industrial plants, during the war, was only in the neighborhood of one and one-half foot-candles. After various experiments with lighting, it was quickly seen that for many operations production could be stepped up, to a certain point, almost in direct proportion to the increase in lighting levels. Such truth and knowledge, gathered from actual experience, served as an incentive or spur for more immediate and thorough, scientific investigations into the realms of light and vision, accounting for marked improvements in the standards for artificial illumination during later years.

Another momentous milestone of progress in lighting practice was reached in 1933 when the announcement of the "Science of Seeing" was first made. For fifteen years an exhaustive amount of technical research work had been undertaken to determine more exactly the relationship between light and vision, and what effect varying intensities and qualities of light had upon the physical and mental well-being, and the everyday work of the individual, who today spends most of his time working indoors. Thanks to the

study of this science, we now know that a few paltry 1½ to 5 foot-candles of light on the inside is hopelessly inadequate, even for some of the simplest visual tasks; and that nature's plan of providing thousands of foot-candles outdoors was after all the best plan for the progress and successful evolution of mankind.

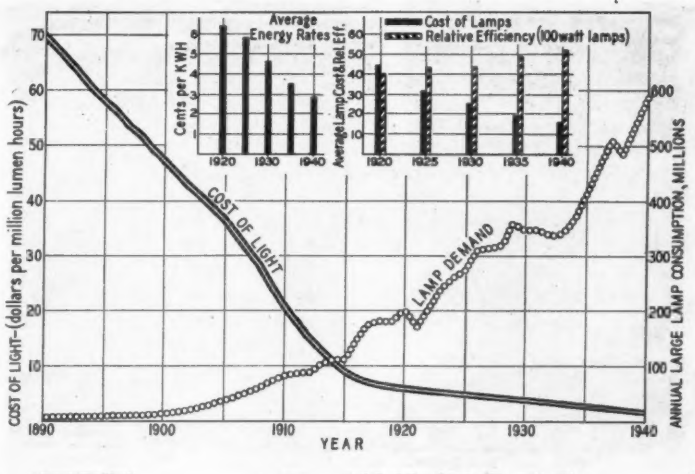
As a result of the research under which the New Science of Seeing (Better Light-Better Sight Movement) was predicated we now have a basis for determining how much light is needed for relatively easy, effortless seeing, under all circumstances. It very definitely pointed the way towards what our next objective should be, namely: the design and manufacture of light sources and lighting equipments which would provide a much nearer approach to the quality and intensity of natural light such as found within the one-thousand foot-candles under the shade of a tree, where our eyes work best. Considerable progress has been made in this direction, but we have only scratched the surface, compared to the lengths we have yet to go, in order to completely satisfy the requirements of natural environments.

The year 1940 finds us at another crossroads. Based upon the more recent developments, we may have every reason to expect that in the future we will behold levels of



It was more than twenty years ago during World War I that industry learned it could speed up production in such plants as this by increasing the illumination. Another important milestone in the progress of lighting came with the discovery of the "Science of Seeing."





The small chart below indicates that twenty price reductions on Mazda lamps, during the past twenty years, have lowered the cost to 27% of the 1921 level. At the same time, efficiencies have been increased an average of 47%. The chart at left shows the trend for past 50 years.



illumination and new applications of light and radiant energy, hitherto undreamed of. Every trend of our present day thought and thinking seems to be heading in that direction.

The soundness of this forecast may also be very well predicated upon the progress and growth of the lighting business within the last twenty years. It should further serve as a fairly accurate barometer of the rapidly accelerating interest in lighting, and its increasingly wider use. Within this period, the industry has grown from an annual production of 200,000,000 large incandescent lamps to 600,000,000, or at the rate of over one billion incandescent lamps of all types. This is entirely aside from fluorescent lamps which have enjoyed a most phenomenal growth from just a few, mere sample lamps in 1938, to a total production of

6,000,000 in 1940, and an estimated 12,000,000 for 1941.

Furthermore, due to the ever decreasing cost of lamps and reduction in energy rates, the same amount of light which today costs us only \$1 would have cost as much as \$3.50 to \$4 in 1920. As time goes on and continued reductions are made in the price of fluorescent lamps, the cost of light will be even more drastically reduced.

The developments within the past two or three years have been perhaps as important as any other ten or fifteen year period in the history of the electrical industry. Formerly, and up until a few years ago, we were only particularly concerned with the radiant energy, produced by Mazda lamps, falling within that portion of the visible spectrum between 3700 and 7200 Angstrom Units of wavelength. Just recently, however, we commenced break-

ing out to the left and to the right of the visible spectrum, into the invisible regions of radiant energy, and discovering tremendous possibilities in these relatively virgin fields. For instance, certain types of mercury discharge lamps produce an abundance of energy of short wave length within the invisible domain of 2000 to 3800 Angstroms, or more commonly referred to as ultraviolet light. This form of light is invisible to the human eye, yet it has some most powerful and important effects upon life, health and happiness.



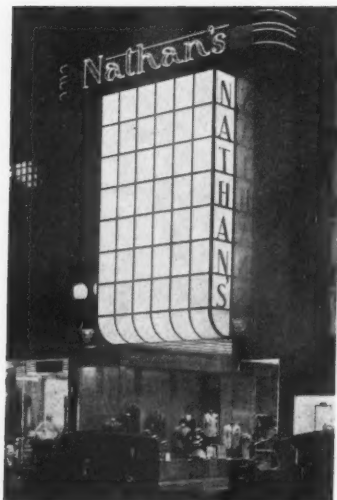
There can be no doubt that the real lighting news of the past two years is the fluorescent lamp. The young lady above holds the newest in this line—the 60-inch 100-watt lamp. At left, an installation making use of a "troffer" system, recessed in ceiling, with 48-inch lamps.

Ultraviolet light, as a whole, may be divided into three distinct classifications. The germicidal lamps which we make are so designed to emit "far" or short wave ultraviolet around 2600 Angstroms, useful for sterilization purposes, the killing of certain forms of undesirable bacteria, etc. Other types of mercury sources develop "middle" ultraviolet rays, of around 2900 Angstroms, for health purposes, such as our 400-watt and 100-watt sun-

lamps. They affect our health in much the same manner as the radiant energy from the sun which we all seek during the summer months. The last type of mercury lamps, producing ultraviolet energy, are the so-called "black light" sources producing "near" or long wave ultraviolet energy of about 3700 Angstroms, used essentially for advertising and decorative purposes with certain substances which have the property of fluorescing



More than 1100 48-inch Mazda F (fluorescent) white lamps are used in Saks Fifth Avenue new Detroit store. This view shows one of the salons lighted by indirect fluorescent covers. Merchandise in wall cases and counter cases is displayed to advantage under supplementary fluorescent lighting. Below, the large expanse of Nathan's luminous store front in Houston, Texas, gives it tremendous attention value and appeal. The luminous panel is lighted by ninety 75-watt lamps spaced on 18-inch centers.



Directly above and below, two splendid examples of floodlighting of commercial buildings. The General Electric Building in New York City, above, is transformed into a 50-story candle of 100,000,000 candlepower by use of blue fluorescent lamps and mercury searchlights. The floodlighted building below is the U. S. Tobacco Co. factory in Richmond, Va. Credited with being the outstanding industrial building in the South, floodlighting gives it that "added touch." The sign is silhouetted by lamps mounted behind the letters.



when subjected to this form of ultraviolet light.

To the right or heat end of the visible spectrum, we now find light sources being used for heat therapy and drying purposes. The wavelengths here are in the order of 10,000 to 12,000 Angstroms.

In order that we may more readily picture where we are headed, let us piece this story together and very briefly see what research has

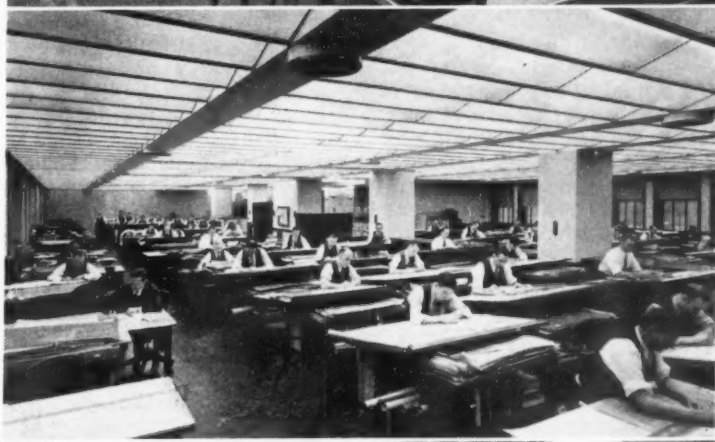
accomplished for the lighting industry within the span of the last twenty years. It has designed lamps for every conceivable purpose. Lamps that die in the wink of an eye, like the large protoflash which lives only one-fiftieth of a second, but during that time emits as much light as an immense battery of thousand-watt lamps, and the new infra-red drying lamp, the Methuselah of them all, which lives

to the ripe old age of ten thousand hours. This envisions for us the story of specialized design for every service.

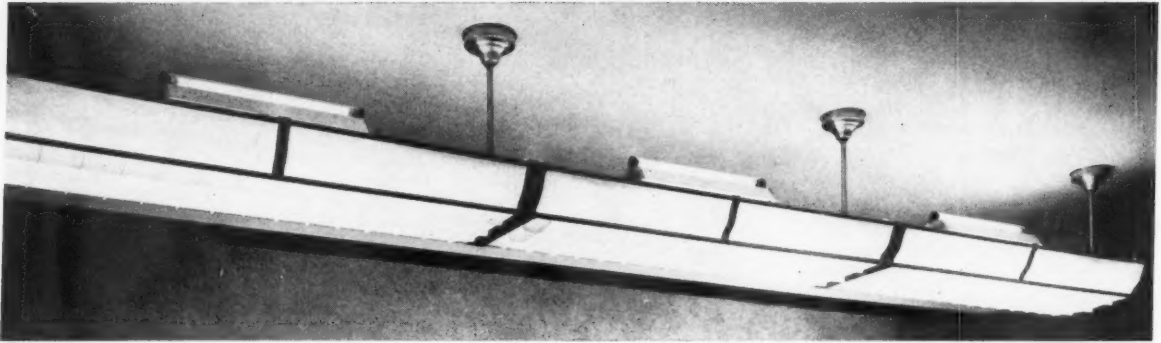
Great as all these achievements have been, research still continues the unceasing battle to increase efficiencies and thus give the consumer more light for his money. Realizing the inherent limitations of the tungsten filament lamp, the engineer experimented with gaseous tubes, and in 1933 a sodium lamp and a high-intensity mercury lamp was developed. These sources produced light at the highest efficiencies ever achieved in lamp manufacturing; the yellow sodium at sixty lumens per watt, and the blue green mercury at forty lumens per watt—whereas the very best we could do with the standard thousand-watt, incandescent filament lamp was approximately twenty lumens per watt. The use of these light sources, of course, is limited to certain locations where the color of light is not a factor and where the high efficiency is of definite value to the consumer.

With the conception of all these new light sources, fluorescent lamps and lighting continues to be the outstanding illumination development. Announced to the public less than three years ago, Mazda F (fluorescent) lamps have stimulated interest in all lighting and have enjoyed wide public acceptance. Few, if any, industries have expanded at the rapid rate seen in the growth of the fluorescent lamp and fixture business.

It is available in eight colors; standard white, soft white, daylight, blue, pink, green, gold and red; and in some colors produces two to three hundred times, or even six hundred times as much light as can be obtained from a colored incandescent lamp of the same wattage. By the same token, however, the white and daylight lamps are only two to three times more efficient. Unlike the tungsten lamps which produce light by heating a filament to a high temperature, or the vapor sources which produce light by means of current flowing through the gas, the fluorescent lamps convert invisible ultraviolet energy into visible light by means of fluorescent chemicals or phosphors with which the inner surface of the tubes are coated. Although this lamp is the baby of the artificial lighting family, it is nevertheless regarded today as one of the very greatest achievements in the field of lamp research. It is



"Lighting for seeing" is the common denominator of these three photos showing interiors of an industrial plant, a drafting room, and a school room. The exacting seeing and the delicate handwork required of the girls in the lamp factory, at top, calls for some 250 foot-candles of light intensity on the task. About 40 foot-candles are supplied by the continuous rows of RLM fluorescent industrial luminaires on the ceiling; the rest is supplied by supplementary fluorescent units on each table. The Commonwealth Edison Co. drafting room, in center, has 85 foot-candles. The ceiling is covered with a saw-tooth arrangement of alternate tilted panels of lightly etched, clear window glass and acoustical material. Lamps are mounted behind glass. Louvered trough reflectors with Mazda F lamps supply 50 foot-candles in this school room.



great because it brings to mankind the cool, white light which has been so long desired, and produces it so efficiently, that we may now prescribe levels of illumination much closer to "nature's plan."

In addition to the standard line of 15, 20, 30 and 40 watt sizes of fluorescent lamps, we have recently extended this to include a higher wattage size—a 60-inch, 100-watt lamp, in the white color, and with over twice as much light as the 48-inch, 40-watt lamp. However, its lumen per watt efficiency rating is somewhat less than that of the 40-watt. It is $2\frac{1}{8}$ inches in diameter and equipped with a mogul bipin base, and requires larger lampholders than heretofore used. The 15-inch, 14-watt lamp was also made available for "two-in-series" operation on a-c or d-c circuits. This

T-12 lamp, three inches shorter than the familiar 18-inch Mazda F lamp, was originally designed for 64 volt, train lighting service. The lamp offers interesting possibilities for many applications since two can be operated in series on ordinary 105-125 volt lighting circuits, eliminating the usual type of fluorescent auxiliary, and instead using a small filament lamp as a resistance ballast.

For applications where a spectral quality requiring a greater proportion of red is desired, Mazda F lamps are available in a new "soft white" color in the standard 18, 24, 36 and 48 inch sizes. This new color should find wide use in the refrigerated meat case field and in restaurants, nightclubs, and the like where foods are served, or where such a color is generally compli-

15-watt germicidal lamps atop the fluorescent luminaires irradiate the upper half of the room with ultraviolet light to kill airborne bacteria.

mentary to an individual's appearance.

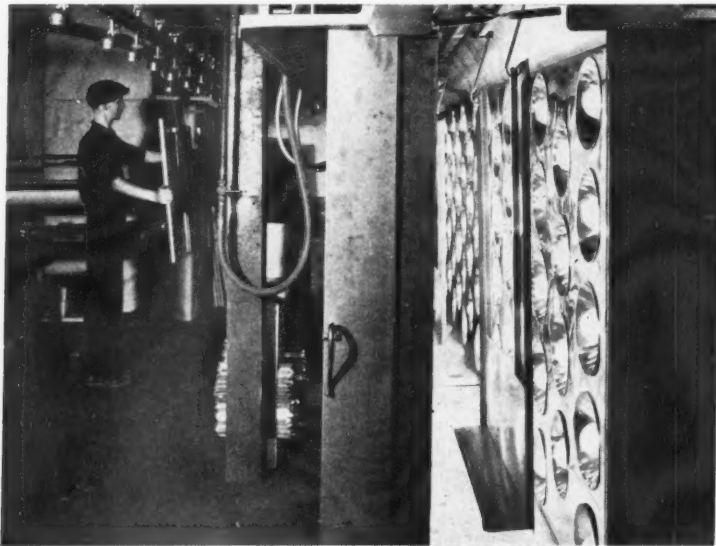
A specially designed 85-watt rectified fluorescent lamp was also made available in both a blue-white and industrial white color, and developed for high intensity, general industrial lighting.

The year 1940 saw the 40-watt, 48-inch fluorescent lamps surpass all the other sizes in fluorescent lamp sales, and its wide use gave more light to thousands of commercial and industrial consumers than it would ever have been possible to provide them before.

The demands of national defense have emphasized the need for more and better light to promote quick and easy seeing in the factory, and literally acres of production area have been relighted with these cool, efficient sources. Particularly effective results have been obtained with the units mounted end-to-end to produce the higher levels of illumination with minimum shadows. These continuous row applications using continuous wiring channels permit a reduction both in installation and wiring costs. In the latest RLM fluorescent fixture designs, the reflectors are easily removable for proper cleaning.

Fluorescent lighting also brought about the development of the "troffer," a trough-coffer combination in which continuous rows of fluorescent lamps are well shielded in louvered troughs, recessed in the ceiling. For example, a fluorescent troffer can replace a row of acoustical material in the conventional suspended acoustical ceiling. Most of these troughs have used white porcelain enamel or lacquer but the

(Continued on page 72)



This drying and baking oven in the Forest City Foundries Co., Cleveland, employs 128 250-watt infrared drying lamps arranged in four banks of 32 lamps each, with two banks on a side. Used to dry and bake enamel finishes on furnace sections, the oven has reduced the time required for this operation by approximately 70 per cent.

WOULD YOU BELIEVE IT ?

THINGS YOU MAY NOT KNOW

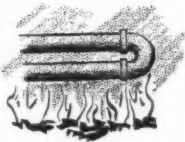
NO HEAT IS WASTED WITH THE HOTPOINT AUTOMATIC ELECTRIC WATER HEATER, FOR THE IMMERSION UNIT HEATS ONLY THE WATER—NOT THE OUTSIDE AIR



FIRST WHITE HOUSE BATH TUB WAS INSTALLED IN 1850 BY PRESIDENT MILLARD FILLMORE, AND IT SERVED THE OFFICIAL FAMILY FOR 35 YEARS



NO HOT WATER!
NEW YORK STATE QUIZ FOUND LACK OF ADEQUATE HOT WATER SERVICE FOURTH IN PEOPLE'S FAVORITE "PET PEEVES"



APPROXIMATELY 20% OF FURNACE FUEL SUPPLY IS USED TO HEAT WATER, TESTS SHOW. ELECTRIC WATER HEATING ELIMINATES THE WASTE OF FUEL



IN THE AVERAGE AMERICAN HOME HOT WATER IS USED APPROXIMATELY EVERY TWENTY MINUTES EACH DAY, ACCORDING TO A SURVEY



ELECTRIC HEATING OF WATER IS SAFEST! NO MATCHES, FLAMES, DANGEROUS FUMES. IT'S "SAFE AS THE ELECTRIC LIGHT YOU READ BY"

LEAKY HOT WATER TAPS OFTEN ARE DUE TO EXCESSIVELY HOT WATER GENERATED BY INEFFICIENT HOT WATER HEATING SYSTEMS. ELECTRIC HEATING KEEPS A CONSTANT TEMPERATURE OF 145° - 150°



AUTOMATIC ELECTRIC

Hotpoint

WATER HEATERS

ELECTRIC RANGES • REFRIGERATORS • WASHERS AND IRONERS
CLOTHES DRYERS • AUTOMATIC DISHWASHERS • ELECTRASINK



NEW HOMES BY THE THOUSANDS—GIGANTIC BUILDING PROGRAM UNDER WAY NOW IN AMERICA MEANS THAT MANY HOMES RIGHT IN YOUR OWN LOCALITY ARE RIPE PROSPECTS FOR HOTPOINT WATER HEATERS

Edison General Electric Appliance Company, Inc.
5614 West Taylor Street, Chicago, Illinois

Please send me full information on the complete line of Hotpoint Automatic Electric Water Heaters.

Name _____

Address _____

City _____ State _____

Leadership in Action

**COLD-WALL VALUES UP
—PRICES DOWN
AS MUCH AS \$53!**

Four out of five Dealer sales of 1940 Frigidaires averaged more than \$162.00! And now, with prices of big Cold-Wall 6's starting at only \$167.75*—with brilliant new exteriors and feature-packed interiors—we think you'll agree that Cold-Wall sales will easily double in 1941!

**More than 100,000 Cold-Walls
were sold in 1940!
Watch this figure soar in 1941!**



All Cold-Wall models have this new streamlined exterior

Model CD-6, illustrated above, is the most beautiful, most useful refrigerator ever made, giving new meaning to the word "De Luxe"! New full-width Super-Freezer Chest includes extra-large section for frozen foods and making ice and desserts. Scientifically designed Meat Tender compartment. Door becomes convenient drop-leaf shelf. Only **\$20475***



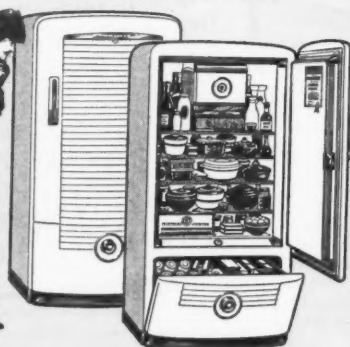
Model C-6, illustrated above, sells at the lowest price ever for a Frigidaire Cold-Wall. Features include larger frozen storage space, new Meat Tender, Super-Moist Hydrator—6.8 cu. ft. Food Com-
partment. Only **\$16775***

Brilliantly New Inside and Out!

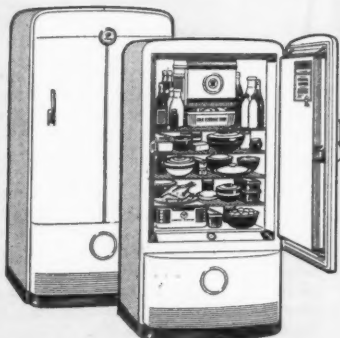
Just Imagine!

3 FULLY-FITTED FRIGIDAIRE—ALL UNDER \$150

Every one with Sliding Hydrators, Quickube Trays and other outstanding Frigidaire Features



FULLY-FITTED M-6—Biggest "Six" in Frigidaire history! Actually has 6.9 cubic foot capacity and 14.2 square feet of shelf space. Fully-fitted including new-style Unlity Compartment, Sliding Glass-Topped Hydrator and with entirely new Fluted Front Design. A great new value at . . . **\$14275***



FULLY-FITTED L-6—Another giant "Six," fully-fitted sensation. Brilliant new exterior, 6.9 cubic foot capacity, with Glass-Topped Sliding Hydrator, all Double-Easy Quickube Trays with built-in tray release, one Double-Width Dessert Tray. Sells for only **\$12775***



FULLY-FITTED S-6—A bargain price for a fully-fitted Frigidaire, packed with features including Super-powered Meter-Miser, Quickube Trays, Frozen Storage Space, Sliding Hydrator. It costs only **\$11775***

*All prices quoted are Dayton delivered prices, and include installation, Federal Taxes and 5-Year Protection Plan. Transportation, state and local taxes (if any) extra. All prices subject to change without notice.

SCORES AGAIN in '41

For '41 FRIGIDAIRE DEALERS Offer America the Hottest Step-Up Line in History

Brilliant new beauty! Use less current!

A world-famous designer creates for Frigidaire completely new concepts of a refrigerator as a beauty note in the kitchen! Now you have striking new step-ups in styling as well as in features!

The bigger, roomier 1941 Frigidaire "Sixes" have 22% more power to keep food better and freeze ice faster! Yet they *cost less to operate* than any previous comparable models.

More useful than ever! Sensational new values!

New food compartments—bigger and roomier! New *Frozen Storage Compartments* up to 74% bigger! Shelves adjustable! Even six cu. ft. model selling for only \$117.75* is *fully-fitted*, including Hydrator moist storage and Quickube ice service!

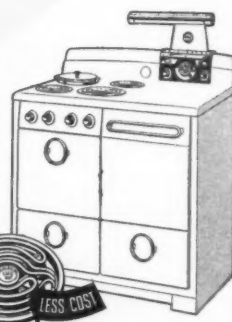
More than a dozen brilliant models to choose from—every one a bargain-priced value. Cold-Wall prices are down as much as \$53. Lowest price ever for a standard Frigidaire "Six" with Quickube Trays—only . . . **\$11275***

—And Here are the New 1941 FRIGIDAIRE *Electric* RANGES

Two Beautiful Series—Eight models, Brilliantly New inside and out!

- New beauty!
- More useful—faster!
- Use less current!
- Sensational new values!

Typical of Frigidaire Electric Range values for 1941 is De Luxe Model B-60. It has the Exclusive New Radiantube Units, Ultra-Modern Fluorescent Lighting, "Cook-Master," Automatic Oven Light, Time Signal, Warming Drawer, Thrifto-Matic Switch, Simpli-Matic Oven Control, plus the dozens of other Frigidaire standard features.



Watch the favorite
Watch Frigidaire

... over 6 million built and sold

Cost Reduction and Reliability

Keynotes Two Decades of Distribution Progress

By A. C. Monteith

Manager of Central Station Engineering,
Westinghouse Electric & Mfg. Co.,
East Pittsburgh, Penna.

PUBLIC UTILITIES twenty years ago made 25 per cent of their annual expenditures for expansion and improvements of their distribution systems. Today this figure has risen to 50 per cent. In the face of these rising costs the foremost objective of distribution designers and engineers has been simplification, to achieve cost reduction without sacrifice of reliability. Concentrated work on the problem has fostered new ideas, new types of apparatus, and stimulated extended experiments, all of which have had marked effects on the industry.

Following World War I, expansion of the industrial and domestic load was so rapid that existing systems were taxed to capacity. Moreover, electrification of industries employing continuous processes made continuity of electric service a prime objective of the utility. Lightning is the worst enemy of the distribution system, so during the last two decades a great deal of

study and experimentation has been conducted to secure a better understanding of its nature and characteristics.

Lightning-Proof Systems

Introduction of the klydonograph some twenty years ago gave the first practical field instrument for the measurement of natural lightning. This was followed by the cathode-ray oscillograph and several other instruments. From the investigations conducted during the period 1927-30 came the direct-stroke theory which is the basis of modern design of high-voltage lines. Today a high-voltage line with ground wires can be made lightning proof. This reliability has been reflected into the low-voltage circuits; and the use of the De-ion protector tube introduced some 8 years ago, helps engineers to build low-voltage lines that are practically lightning proof. Lightning generators, installed in laboratories to simulate natural light-

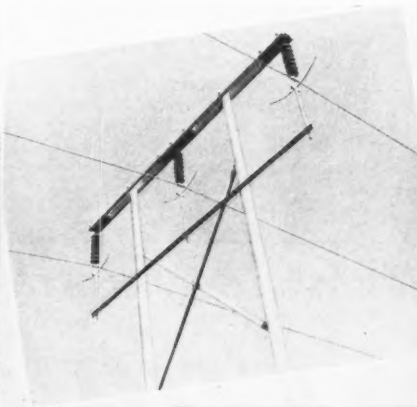
ning have made possible a thorough investigation of the characteristics of insulation as affected by lightning. From studies of natural lightning and on insulation structures, substations and equipment also can be made practically lightning-proof.

The quest for more detailed knowledge of natural lightning characteristics led to more field work and has stimulated the design of some new instruments. These new investigations are built primarily around the fulchrograph, an instrument which facilitates measurement of the current-time relationship in a direct stroke. It consists of a large number of pieces of permanent magnet steel, mounted on the periphery of a continuously rotating wheel that passes the steel through a coil connected in the expected lightning path. A measurement of the induced magnetism in the steel gives the crest current, while time is obtained from the speed of rotation.

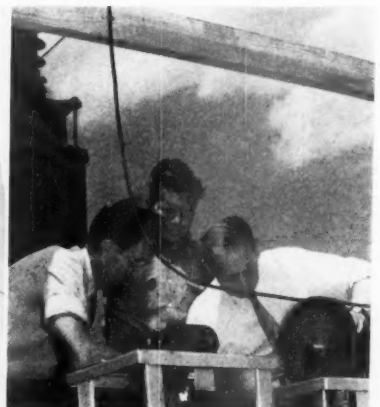
With 53 of these instruments in the field, 12 separate strokes comprising 57 individual components were obtained. Currents ranged from 500 amperes to 160,000 amperes. From lightning-arrester installations 55 records were obtained with currents varying from 100 to 10,000 amperes and a duration in the multiple discharge of more than 7/10 second. Some individual components lasted as long as



The klydonograph furnished much valuable information on the characteristics of natural lightning and switching transients in the early field investigations.



The De-ion protector tube has been extensively used for improving the performance of existing lines as well as on new lines for voltage classes up to 138 kv.



Data secured with the fulchrograph has extended knowledge of natural lightning, providing an instrument that measures magnitude and duration of the surge.

The "LEADERSHIP LINE" for '41!

The Finest General Electric Ranges Ever Built!



Every Roast will work for you in 1941!

G-E "ROAST OF THE MONTH" CLUB

will bring customers into your store!
Get details from your G-E Distributor!

The Stratoliner Model DD2-41

Styled for LEADERSHIP in 1941!



Chancellor Model DD1-41



Airliner Model CD3-41



Master Model CD2-41



Leader Model CT1-41

Now You Can Sell the G-E "LEADERSHIP LINE" at Lowest Prices in G-E History!

Now, for 1941, G.E. gives you a line of electric ranges that hits a new high in performance and a new low in price. See this new line, and your eyes will pop at new beauty, new sales features, new customer appeal.

And remember—this finer range will be backed by bigger promotion than ever—in national advertising, mailing pieces, color displays, ads for local papers—

G-E "Roast of the Month" Club a Real Builder of Sales!

Here's a promotion that actually delivers prospects at your point of sale. Every woman will want to win a free G-E Electric Kitchen or a free G-E

everything you need to cook a juicy profit on G-E Ranges.

The trend is to electric cooking. Figures prove this fact. And in 1940 the rate of increase in the sale of G-E Ranges was twice as great as the entire industry.

Swing ahead with the G-E "Leadership Line" for 1941. Get your G-E distributor's story of a proposition that's a honey!

Range. She'll come into your store to get the entry blank. Tie up with this promotion and clean up with G-E Ranges.

GENERAL ELECTRIC

2300 microseconds.

These results have had a pronounced influence on the design of lightning arresters of both station and line types, and have influenced the design of De-ion protector tubes which are being used for protection of apparatus in the lower voltage classes. Co-ordination of practical information about surge currents of large magnitude with new knowledge about characteristics of apparatus insulation brought forth an arrester that will carry large surge currents for long times and still protect insulation. Modern arresters can carry more than 65,000 amperes and be ready for the next assault. The probability of the arrester having to carry such a current is small. As a result of these investigations many failures of distribution arresters have been accounted for by the long duration of surges. Designs of protective devices now take this into account without changing protective characteristics. Arresters

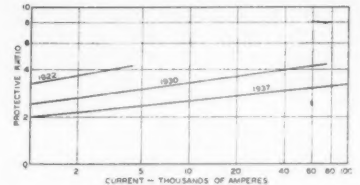
of both line and station types, at the present time, are designed in units so that a higher voltage arrester is obtained by simply stacking such units.

These lightning investigations have also played a prominent part in the design of distribution transformers. Their design has been co-ordinated to give greater electrical strength, largely by changes in clearances. The simple lightning arrester connection, with its possible high lead and ground resistance drop, has fast given away to the interconnection and three-point protection schemes. In the latter, the use of a protective device tied into the tank by a gap or solid connection limits the surge voltage that can appear from the high voltage winding to the tank. Flashover of the low voltage lead to tank is limited by secondary design and so the stress from high to low is limited, giving protection to the three major insulation points.

Out of these ideas has come the completely self-protecting distribution transformer. Several hundred thousand in sizes less than 50 kva are now in service and have proved themselves to be almost immune to damage from lightning. This type of transformer incorporates burnout protection by means of a thermally operated secondary breaker, and the high-voltage line is protected by a fusible link placed in the high-voltage side to disconnect the transformer from the line in case of internal fault. The general principle of the completely self-protecting distribution transformer has been incorporated in transformers up to 3000 kva and 66 kv. Use of the self-protection scheme in distribution transformers materially reduced maintenance and installation costs, while in power units it has given a more portable and compact design of substation. Burnout protection has been made practical in both the distribution and power units by a thermal device simulating copper temperature. This device allows the transformer to be loaded by copper temperature, so that greater short-time overloads may be carried without fear of burnout.

Reclosing of breakers has become popular as a means of maintaining service on distribution systems, and the reclosing scheme is being utilized extensively on the feeder breakers. A small pole-top single-phase breaker, now developed, carries this idea to the smallest branches of the distribution system.

Protection of meters has become



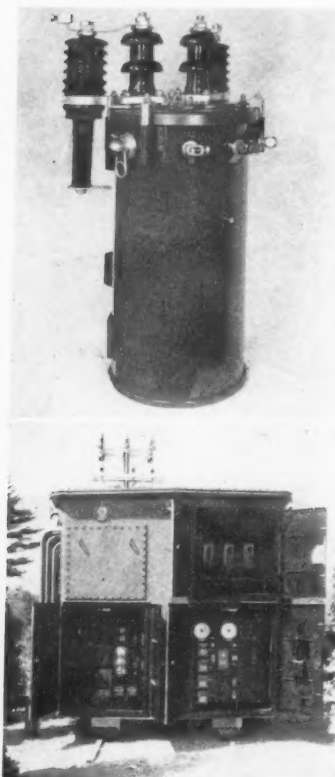
Lightning arrester characteristics have been improved, as a result of field investigations, so as to limit the voltage for higher magnitudes of surge current.

important as a result of widespread distribution of electricity in rural areas, so a protector has been built to be placed on the circuit directly ahead of the meter whether installed indoors or outdoors. The design and installation of this equipment has been made possible through a better knowledge of the characteristics of natural lightning.

Stability Studies Important

Increased loading of circuits in the early twenties called for heavier loads on existing utility lines. As a result, considerable work on system loading and stability was undertaken in the intervening years. Out of this has come reclosing circuit breakers, high-speed breakers and relays, and among other things a more scientific attack on system planning. This was facilitated by the introduction of the a-c network calculator some ten years ago. On this device it is possible to set up a complete system in miniature and subject it to loads and faults before any investment is made in the system. This is, no doubt, one of the greatest labor-saving devices introduced in the last two decades. Its use has been extended to general distribution studies with marked results. Many network calculators have been installed by operating companies, and normally they pay for themselves in a short time.

Cost reduction made possible by improved static capacitors has made their application quite popular. Capacitor costs have been practically halved in the last twenty years so that today the installed cost is from \$8 to \$10 per kva. Some capacitors have been installed for improvement of voltage conditions but release of system capacity has been one of the main justifications for their use. Units of the hanger type have made possible more compact installations with greater flexibility in arrangement and size. When it is considered that an investment of from \$10 to \$20 in



Introduction of the completely self-protecting distribution transformer, at top, has minimized installation expense and provided a transformer that defies lightning. The same principles have been extended to larger transformers, such as that shown below, with marked success.



A-c network calculator allows setting up a power system in miniature and operating it with all combinations of loads and faults before any investment need be made.

capacitors, depending on the power factor of the circuit, might release as high as \$300 per kva in system investment, the reason for their expanding use to release system capacity is apparent. Fast-developing national-defense loads are in many cases being met by this simple expedient.

Installation of capacitors on some systems resulted in an increased fifth-harmonic current, sometimes to the extent of tripping the capacitor breaker or blowing the capacitor fuse. A general investigation of effects for the harmonic source in the transformer magnetizing current was conducted on the a-c network calculator and later checked

in the field. As a result of these studies, it was found that the installation of some capacitors might increase the harmonic currents, but by further addition of capacitors, system conditions were improved and the harmonic currents became of negligible importance.

Networks Improve Reliability

The automatic a-c secondary network system was developed to meet the need for an a-c system which would render substantially the same quality of service as the d-c network, and at a lower cost. First use of the system was made in New York about 19 years ago, and today is used to supply electric energy to the business districts and important loads of 152 cities and towns in America. The widespread acceptance of this type of distribution system is a result of its high degree of reliability, its flexibility, its simplicity, and its economy. The economies in first cost, operation, and maintenance are more marked in the load areas of high density, such as in larger cities, and it has been used most extensively in such areas. It is applicable, however, in cities and towns of less than 25,000 population, and to date has been installed in 22 such cities.

While the system is usually installed completely underground, equipment especially designed for overhead use has been available for about eight years and several overhead networks are now in operation. Regardless of whether a load area is to be served underground

or overhead, the a-c secondary network should be seriously considered if service reliability is of primary importance, if the load is growing or changing rapidly, or if the load density is over 2,500 kva per square mile.

The marked success of the secondary network system has led to the use of the network principle on overhead systems in areas of lighter load density, where a secondary network usually cannot be economically justified. In these areas the system takes the form of a primary network, with networking on the primary rather than the secondary side of the network or distribution transformers. Since consumers are supplied by radial lines from the distribution transformers, quality of service on this system is not as



A breaker has been developed that allows reclosing to be applied on the smaller branch feeders of a distribution system.



This protective device can be installed ahead of meters, providing a path for the surge current other than through the meter and thus into the building.

good as that of a secondary network where the networking is done near the consumers at utilization voltage. Chief advantages of the primary network are flexibility, simplicity, and economy. The small substations are fed over radial subtransmission circuits without any primary switchgear. Secondary sides of stations are tied together in the form of a grid or network, usually at 2300 or 4000 volts. These secondary ties provide emergency feed to any substation whose primary circuit and transformer are out of service. Thus it is unnecessary to provide duplicate feeds to the substations together with the necessary high-voltage switchgear. The primary network provides as good or better service than the radial type system at lower cost.



IT BENDS · DOES NOT FLAKE · RUST-PROOF

"THERE IS ONLY ONE SHERAR DUCT"



National Electric Product Corp.

Distributed by recognized Electrical Dealers

WAREHOUSES — Atlanta, Boston, Chicago, St. Louis, Denver



*REEDGE • RUST-PROOF

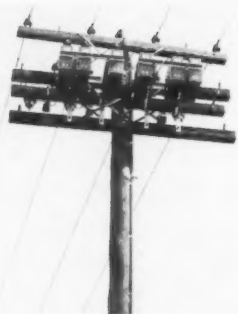
*PROTECTED AGAINST CORROSION TO
SAME DEGREE AS CONDUIT STANDARDS

Electrical Corporation - Pittsburgh, Pa.



Electrical Corporation - Pittsburgh, Pa. Dealers throughout the United States

Branches in: Denver, New York, San Francisco, Seattle, Philadelphia



The hanger type capacitor is flexible in installation as it can be mounted on distribution poles in any rating that can be arranged on a pole top.

Out of these network ideas have come some further applications. The secondary low-voltage network has found its way into power plants for powerhouse auxiliary supply, shipyards, industrial plants, and is even being considered for auxiliary power supply on ships. Although the majority of secondary networks are 208-volt systems, the installation of limiters in cable ties permits its application at voltages up to 440. Such a system is being used in a shipyard.

The unit type of substation for primary networks has been extended to the radial system; combining transformer and switchgear in one unit makes a more compact substation. The self-protecting power transformer with one secondary breaker likewise is being considered for primary networks. The single unit would be installed at the intersection of primaries, and reclosing

breakers would be installed at the midpoint of the primary connections between intersections at transformer installations.

Air-Insulated Devices

Elimination of fire hazard in distribution and power substations is the foremost problem of the moment. Air-insulated types of breakers, air-cooled transformers or non-inflammable liquid-cooled transformers, and aircooled regulators are being considered.

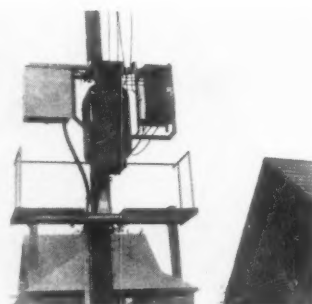
Introduction of the compressed-air circuit breaker has extended the possible design of an air-insulated device from 900,000 kva to 2½ million kva interrupting capacity at 15 kv. De-ion breakers of somewhat lower interrupting capacity were introduced some ten years ago. The development of a 1½ million-kva circuit breaker necessitated over 200 interrupting tests to prove its sufficiency before being released for commercial use. The Westinghouse high-power laboratory at East Pittsburgh now provides equipment which is capable of testing high interrupting capacity breakers to their full capacity. Such laboratory equipment makes possible a thorough testing of breakers and the improvements have been marked. In the late twenties the older designs of breakers showed signs of distress as a result of interconnections and increased industrial loads. The modern breaker, proved in the laboratory, is a very reliable device.

Non-inflammable liquids for cooling transformers has found wide use in an attempt to minimize fire hazard. The liquid, of the aralor

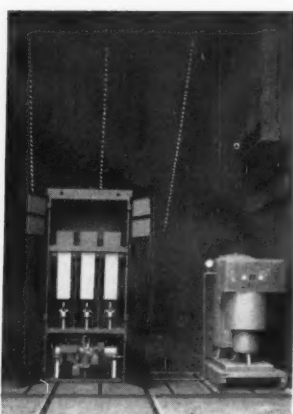
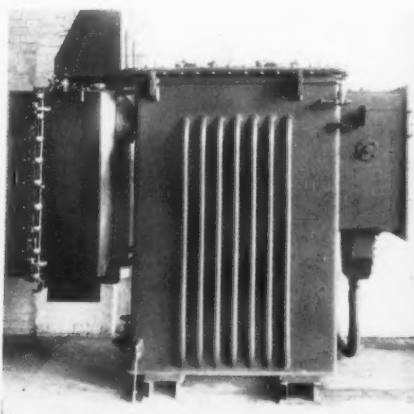
family, has good insulating properties and will not burn.

Development of high temperature insulation has made possible the design of an air-cooled transformer in sizes up to 1000 kva and in voltage classes up to 15,000. It can be installed without expense of enclosures and is being used in secondary-network building vaults, and in industrial factories.

One outstanding trend is the use of tight tanks on transformers. It has been found by test that if oxygen is excluded, oil sludging is almost eliminated, and the transformer can carry higher short-time loads without damage. So important is this considered that all transformers from 1½ kva to the largest are being made tight, and in the larger sizes inert gas is provided to allow breathing without building up excessive pressures in the tank.



The a-c low-voltage network has been extended to overhead systems allowing a broader application of the network principles.

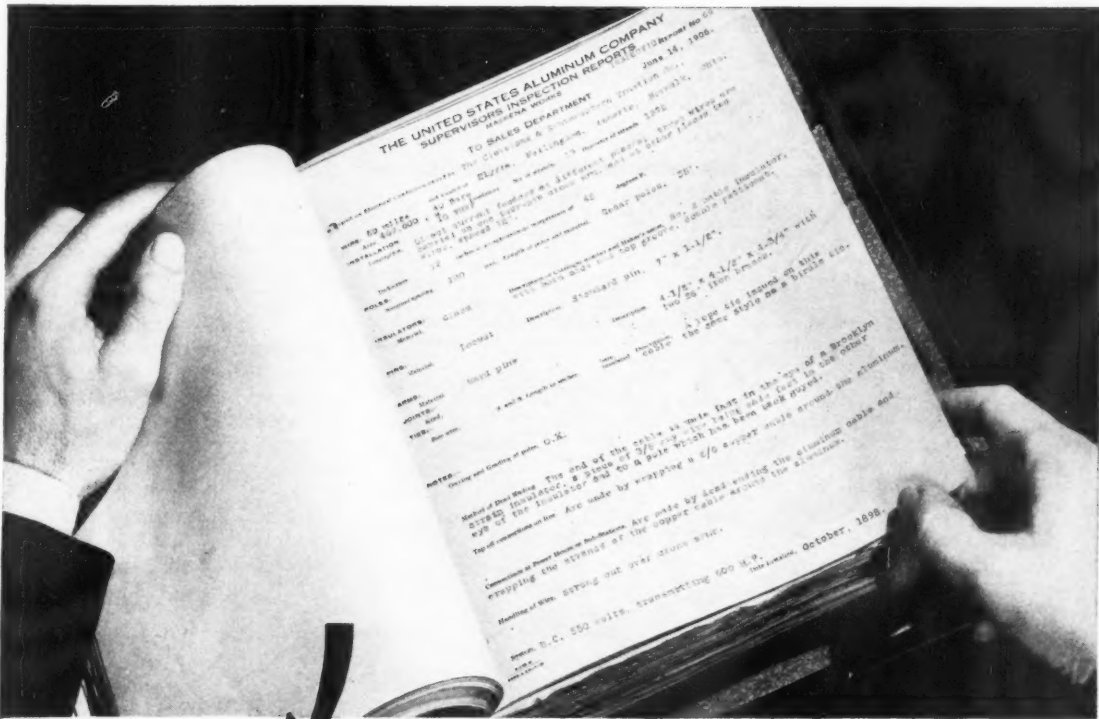


Left, the low-voltage secondary network has also found use for powerhouse auxiliary supply where a high degree of reliability is necessary. At right, a compressed-air circuit breaker in a test cell at the high-power laboratory where it was tested.

Vacuum filling of transformers and regulators has improved their impulse strength to lightning quite materially, making possible a complete co-ordination of insulation in a substation, with better resultant protection. Transformers can be designed for vacuum filling in the field. The combination of a vacuum-filled transformer, giving high impulse strength, and the tight tank giving freedom from sludging or oxidation, results in a balanced design that can be loaded by copper temperatures, and is an economical installation.

The development of the industry has been so rapid in the past twenty years that one might wonder whether a saturation of ideas is being reached. A review, however, shows that the development of the industry is still at a high tempo. Therefore, the future holds much as far as developments are concerned.

"I helped make Conductor History"



DEFENSE COMES FIRST

To meet the needs of the National Defense Program, plus the normal demands of peace, a vast expansion of our already greatly increased production capacity is being speeded. When the emergency is past, there will be more Aluminum available than ever before.

Meanwhile, if you can't get all the Aluminum you want when you want it, remember Aluminum is helping you by helping to meet the National emergency. Aluminum Company of America, 2164 Gulf Bldg., Pittsburgh, Pa.

From the earliest days of Aluminum power lines, our engineers have been "in the field;" assisting designers and builders, studying the performance of finished lines. Observations were recorded in books like this.

Vitaly important to industry was this study of the performance of these first Aluminum lines. Refinements responsible for the great dependability of present-day power lines were based on such on-the-job records.

A.C.S.R. evolved as the use of longer spans required higher strength conductors. Suitable accessories and construction methods have been developed and proved, even including a perfected system of vibration control.



Reg. U. S. Pat. Off.

A • C • S • R

Aluminum Cable Steel Reinforced

FOR HIGH VOLTAGE TRANSMISSION and RURAL POWER LINES

Famous Men Cooks Featured in Spring Range Campaign

AN OUTSTANDING, news-making promotion that will have the men of the nation "running around in aprons and women running around in circles," hits the horizon of the New Year as the Modern Kitchen Bureau announces a Spring 1941 electric range campaign that:

1. Awards diplomas in the art of "he-man cookery" to men cook hobbyists in return for their favorite recipes.
2. Awards a booklet of "Famous Recipes by Famous Men" to both men and women who call at utilities and dealers.
3. Makes available a special painting by James Montgomery Flagg—in life-size, full-color window displays.
4. Provides Flagg art for utilities' and dealers' own newspaper advertising.
5. Invites men and women into showrooms all over the country,

Nation-wide round-up of He-Man Recipes to lend unique background to record-year showing of ranges.

to witness the "Record-Year Spring Showing" of electric ranges.

6. Offers a complete selling plan, with all necessary materials, to make 1941 the "biggest year in history in the sale of electric ranges."

The plan, originated and carried out by twelve participating manufacturers, is fully explained in a large plan book—also in sample kits of materials mailed to utilities throughout the country and in a special dealer plan folder with a mailing list of some 22,000 dealers.

The diplomas to be awarded to the nation's men who like to fuss around the kitchen and dish up special concoctions are rigged up in imposing official style. They carry the He-Man Cook official seal; they are signed by James Montgomery Flagg, one of the country's best known amateur cooks. Space is also left for the signature of the utility or dealer and the He-Man cook's name.

The booklet, "Famous Recipes by Famous Men," contains choice special recipes by noted Americans—recipes collected especially for this campaign. Each is complete in detail, exactly as the men themselves wrote them, plus any necessary specific instructions as given by one of the country's foremost testing kitchens. Each recipe also carries the name of its sponsor, briefly outlines who he is, and is illustrat-

LOOK, IT'S ROUND-UP OF HE-MAN Recipes

... AND ELECTRIC RANGE Record Year SPRING SHOWING

Free
BOOKLET OF RECIPES MEN LIKE
by these
CELEBRATED HE-MAN COOKS
JAMES MONTGOMERY FLAGG
VICTOR MCLAGLEN
GUY KIBBEE
HAL PEHVE
and many others

GET YOUR COPY DURING
ELECTRIC RANGE Record Year SPRING SHOWING

Now, bring in the recipes of things you like to cook ... win this diploma as a HE-MAN CULINARY ARTIST

WOMEN:
If your husband is too modest, bring in his favorite recipe *yourself* and enter it in our big local HE-MAN RECIPES ROUND-UP

ELECTRIC RANGE Record Year SPRING SHOWING

The complete James Montgomery Flagg painted window display, done in full-color life-size cut-out that: (1) Calls attention to the He-Man Recipe Round-Up, (2) the Record-

Year Spring showing, (3) awarding of diplomas to local He-Man Cooks and announcing the premium booklet "Famous Recipes by Famous Men."

Red Hot News!

EXTRA



Hotpoint News



EXTRA

DEALERS MAKING BIG 2-WAY PROFIT ON HOTPOINT CALROD ELECTRIC RANGE REPLACEMENT UNITS!

SMASHING PRICE REDUCTIONS!

UTILITY SIZE
WAS \$7.00... NOW \$5.95

GIANT SIZE
WAS \$9.00... NOW \$7.95

(Prices include stainless steel adapter rings)

Fit practically all makes of electric ranges with Hotpoint Calrod's minimum number of Adapter Rings... cut your inventory... increase your turnover... save stockroom space and make good profits!



A RED-HOT MARKET is waiting for Hotpoint Calrod Replacement Units—a 2½ million market! There are that many old-style electric ranges that need modernization and will welcome cooking with Calrod's "Measured Heat." Important new price reductions on these famous nationally-advertised units open wide the door to more and more sales of new electric ranges, too, dealers are finding. First, modernize old ranges. Second, sell new Hotpoint Electric Ranges. Make a Two-way Profit! Try this "Measured Heat" sales tonic in your territory. Get in touch with your Hotpoint distributor or district representative. Edison General Electric Appliance Co., Inc., 5614 West Taylor Street, Chicago, Illinois.



OLD

SELF-CLEANING
FASTER
MORE EFFICIENT



NEW

YOU CAN SEE THE DIFFERENCE!

Cash in on the great National Advertising Campaign Hotpoint has launched on the new 1941 Hi-Speed Calrod. There's a big public interest in "Measured Heat"—and your customers are already sold on Hotpoint. And a pre-sold customer is twice as easy to sell a new range or replacement unit!

Hotpoint

Calrod

ELECTRIC RANGE SURFACE UNITS WITH INCONEL SHEATH AND BUSHING GLASS-SEALED TERMINALS

A wide range of promotional material will be made available to utilities and dealers. Shown at right, top, attractive interest-arousing direct mail pieces; center, an enticing envelope enclosure; bottom, special newspaper ads.

be used in the range promotion. As officials of the Bureau point out:

"Attendance and interest in cooking schools can be greatly increased through demonstrating both the national and local He-Man Recipes. An additional card for the show window covers this angle nicely."

The Bureau continues: "Then, for the utility or dealer who really wants to go the limit, getting reams of publicity as well as adding a contest-interest to the campaign, there may well be an election of 'King He-Man Kook.' This could be handled by having a committee of local women to select the best He-Man recipes of the week during the period of the campaign, and from these singling out the best one." All of these extra features are explained in the big plan books.

That there is a tremendous amount of interest in male cooks is evidenced by the increasing number of amateur men cook clubs springing up all over the country, along with the fact that men are being selected to write cooking articles for women's national magazines. Four of the Kitchen Bureau's Famous Recipe Men are authors of cooking articles. J. George Frederick, president of the Gourmet Society in New York, has published several widely read books on food men like to eat. Mr. Nejel-ski and Mr. McFadyen have both appeared in Good Housekeeping with signed articles on He-Man eating. Dick Pine, of Hollywood, gained fame for a magazine article called "Women Can't Cook."

However, it remained for the Modern Kitchen Bureau to bring this timely hobby into national use.

"The kitchen," these male cooks declare, "was once a sissy place. But no longer. Now the kitchen is the playground for the National Order of He-Man Skillet Tipppers!"

Utilities and dealers who have not received the Bureau's Plan Books or kits of sample materials—or who want further information—are asked to communicate with the Modern Kitchen Bureau, 420 Lexington Avenue, New York City, or any of the participating manufacturers.



MANUFACTURERS' & News

Room Cooler Association Formed by Manufacturers

A Room Cooler Division has been formed by the Air Conditioning and Refrigerating Machinery Association, Inc., reports S. E. Lauer, ACRMA president. Membership in the Room Cooler Division will be limited to those Association members engaged in the manufacture or sale of self-contained room coolers and room air conditioners in capacities up to 15,000 Btu's per hour.

The Association states that the principal activities of the ACRMA Room Cooler Division will be the compilation of industry statistics of sales and inventories, equipment standardization, and standard rating and testing and certification of capacities of various models of room coolers.

"The past few years have seen substantial growth in the use of room coolers for a variety of comfort-cooling applications," the ACRMA announcement continues, "and it is expected that this type of equipment will eventually provide an important volume of sales for the air conditioning industry. A constantly-improved product and increased sales, particularly in the residential and small office markets, should result from the establishment of the ACRMA Room Cooler Division."

The ACRMA announcement has another point of special interest to the air conditioning industry in stating the size or capacity of room coolers in Btu's rather than in terms of the generally-used, but now almost meaningless, "horsepower." On this, the ACRMA release comments: "As motor nameplate ratings, notably in the smaller sizes, are far from reliable guides, it is logical that the air conditioning industry should seek a less elastic yardstick by which its customers may measure value."

Air conditioning equipment, tested and rated under standard conditions and sold on the basis of certified Btu capacity, should be an improvement over present practice. It will be interesting to observe how soon and how generally the air conditioning industry and its customers will accept this change in terminology.

Calrod Replacement Unit Prices Are Reduced

A sharp reduction in cost, and several design refinements in Calrod replacement units are the outstanding factors in the Hotpoint Company's 1941 electric range replacement unit plan, just announced by D. C. Marble, manager, Hotpoint Product Service Division.

Although the program has been operating less than one year, increased volume and improved Calrod manufacturing facilities make it possible to reduce the prices of 1941 Calrod Reconditioning Units from \$7.00 to \$5.95 for the Utility size, and from \$9.00 to \$7.95 for the Giant Size Units.



Retaining all the exclusive features to which Calrod units owe their unparalleled service record, 1941 Calrod Replacement Units incorporate several improvements over older types. Due to widening and lengthening of the three notched spacers used to locate Calrod Replacement Units in the cooking top opening, the 1941 units fit more firmly into the cooking top. Connection of ground wire to the replacement unit has been greatly simplified.

New terminal blocks on 1941 Calrod Replacement Units are beveled on the bottom to give greater clearance, and insure easy removal of the drip tray, regardless of the make of

old electric range on which the unit is used.

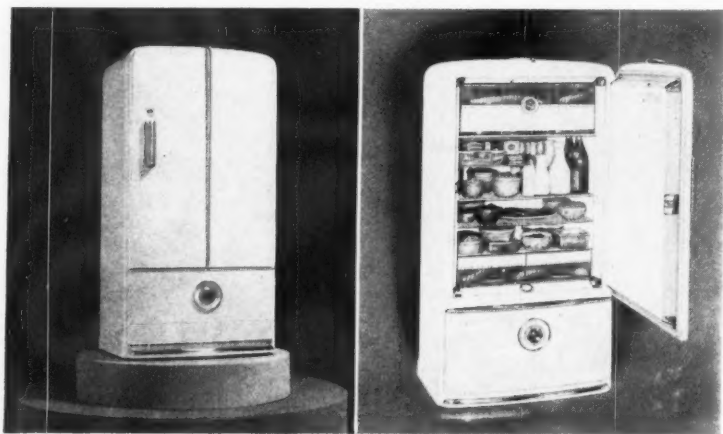
In 1941 units the Calrod coils have been raised about 3/32 of an inch higher above the cooking top, and the opening in the aluminum reflector pan has been increased to 2 inches in diameter. These changes improve even further the unmatched performance of Calrod Replacement Units.

Two new adapter rings have been added to the Calrod Replacement Unit stock, making a total of nine adapter rings and two heating unit assemblies (One Giant and One Utility Size). With this comparatively low replacement inventory, retailers can fit practically any make of old electric range with new, modern Calrod units.

Any service man can carry two Calrod heating unit assemblies, and nine adapter rings, and be in position to service most any electric range he may encounter, without returning to headquarters for needed material.

Frigidaire '41 Models Introduced to the Trade

Three new cabinet styles, in place of one general design for all models, are a major innovation included with 1941 Frigidaire household electric refrigerators, according to an announcement by officials of Frigidaire Division, General Motors Sales Corporation. The company, in a series of nationwide meetings, is just completing introduction of 1941 products to its national sales organization. Deserving of special mention is the fact that all variables of individual desires in style, size and price have been taken into account in designing the 1941 line. These factors, company executives stated, have been given close study the past year with the result that in 1941 Frigidaire



Two types of Cold Wall models are offered by Frigidaire in 1941. Both have the striking exterior design shown in the above picture of a Cold Wall Deluxe 6. A new chest-type freezer, that extends across the entire upper portion of the cabinet interior, and which provides 74 per cent more frozen storage space, is one of the outstanding features of Cold Wall models. Addition of another full size food shelf that provides almost two square feet of extra storage space also is another improvement. The meat tender compartment in the chest-type freezer is 45 per cent larger, while storage capacity in the food compartment also has been increased.



Dramatizes Inside Story of NEW Westinghouse *Electric* Water Heaters

"Prospects can't tell much about water heaters from the *outside*. What we want is a selling piece that will show the extra *inside* value of Westinghouse Water Heaters." That's what the nation's outstanding water heater retailers told us!

And the new X-RAY VISUALIZER does just that! X-ray windows in the big 16" x 24" pages enable you to virtually take the heater apart in

front of prospects. You can *show* them, feature by feature, how Westinghouse gives them more value for the money!

Put this convincing and dramatic sales closer to work now winning *extra profits* for you with the NEW line of Westinghouse Water Heaters! Westinghouse Electric & Mfg. Co., Merchandising Division, Mansfield, Ohio.

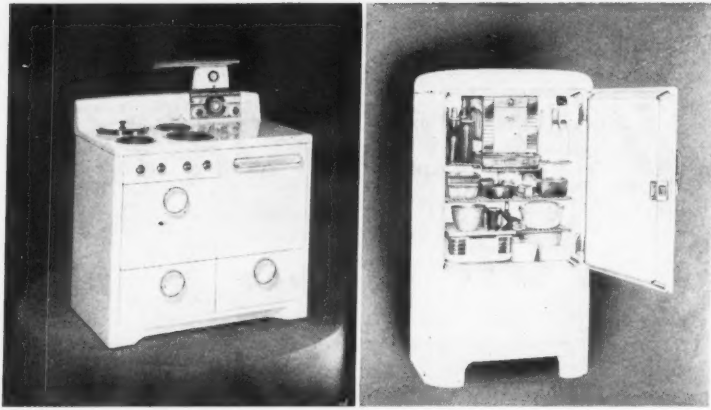


... with new streamlined beauty, new sales appeal and new extra-value features including handy Cleanout Opening and Copper Heat Trap. See them . . . **SELL** them for extra profits this year!
The complete line includes models to fit every market requirement.

Westinghouse *Electric* Water Heaters



FROM THE *Leisure Line* OF ELECTRIC HOME APPLIANCES.



Selling for only slightly more than Frigidaire's lowest price 1941 model, the S-6 illustrated at right above, has a sliding hydrator, cold storage tray, Quickube trays, a refrigerated top shelf in the freezer, safety-cycle defrosted and other convenience and operating features. A thoroughly modern design for electric ranges that is practical as well as exceedingly beautiful is evident in this 1941 model Frigidaire electric range. One outstanding feature of this model, the B-60, is a fluorescent range top light which provides an even glow of glareless illumination with only 15 watts of current. Front and rear instrument panels are at a slight angle, the sloping design making controls easier to read.

feels its new line offers an unusually wide scope of appeal to all types of buyers.

With a total of 15 electric refrigerator models, 9 less than last year, of which nine are of six cubic foot capacity, Frigidaire has simplified its model set-up to make available a more logical price range than previously has been possible. Reduction in the number of models offered, the company believes, also will enable dealers more universally to display each model representing the complete line.

Seven of the fifteen 1941 models are of the Cold-Wall type, the method of producing moist cold in refrigeration, first introduced by Frigidaire in 1939 models. Success of the Cold-Wall during the past two seasons has established its major importance in the Frigidaire line, company officials pointed out, with the result that a larger proportion of the line this year consists of Cold-Wall models.

For the first time in five years, Frigidaire in 1941 is producing single door cabinets of nine cubic foot storage capacity. There are two such models, one with exterior finish of dulux and one with porcelain. Both are in the company's Cold-Wall line.

An entirely new conception of cabinet styling is found in 1941 Frigidaire household refrigerator models. Four models in the lower price series resemble somewhat the design used last year, but throughout the remainder of the line cabinets have undergone extensive re-styling. This year, Frigidaire officials point out, each series in the line can be instantly identified by the exterior appearance alone.

In each of the three new cabinet designs the object has been to make them distinctive and modern in appearance. One series of cabinets, for example, has modernistic fluting placed horizontally across the door panel, an attractive black and chrome

base and a new type of door latch. Throughout the line of new cabinets, doors are wider and afford easier access to the food compartment. All models in the Cold-Wall line, including both regular and deluxe models, have handsome new cabinet styling which includes a raised heavy chromium finished strip extending up the center of the door and across the top of the cabinet to the rear. Other features of cabinet design also express the modern designer's interpretation of line and form.

New Range Features

Increased speed of from 12 to 18 per cent, with a new surface cooking unit developed in the company's own laboratories, is announced as a major improvement in the 1941 electric range line of Frigidaire Division, General Motors Sales Corporation. Of tubular design, and permanently sealed against outside air to prevent oxidation of the enclosed heating coil, the new heat units allow an increase of 100 watts in the capacity of both the large and small top units. The large unit in 1941 models is rated at 2,100 watts while the smaller units have a capacity of 1,300 watts. The new tubular units are constructed of stainless steel, are easily cleaned and each has a stainless steel, removable drip tray. Every range in the line is equipped with the new type surface units.

The new range models were included in the recently completed product presentations staged nationally for Frigidaire's distributor and dealer organizations in various sections of the country.

"Absence of 'gadgets' in all models of the 1941 Frigidaire electric range line is apparent to anyone giving the ranges even momentary inspection," commented P. M. Bratten, general sales manager, Frigidaire household appliance division. "Elimination of

items not strictly involved in operation of the range permits concentration of more value in features which contribute to cooking convenience, economy and dependability. Unusually careful consideration has been given to development of operating features, so that in 1941 models they set a new high standard of performance."

Nine models, representing a complete price selection, are included in the Frigidaire electric range line this year. These models are the B-70, B-60, B-45, B-35, B-15, B-10, L-10, BC-5 and A-6. All "B" models are of the solid base type, the "L" model is a low-priced leg type, the "BC" model is a combination range offering both electric cooking features and coal and wood heating facilities, while the "A" model is a special range designed for installation in apartment houses. The B-70 has two ovens while each of the other ranges have single ovens. All regular ovens are full size and of equal capacity in each range in the line.

Easy Spring Promotion Features Laundry Clinics

A home laundry clinic prepared with the aid of leading women's magazine editors will be the spearhead of Easy Washing Machine Corporation's spring promotion, which will start February 20 throughout the country. Based on service benefits that will help women solve their washday problems, this educational campaign has been received enthusiastically by editors of trade and national magazines, with whom it has been discussed.

Launched in conjunction with the annual Easy-Oxydol cooperative drive, the clinic promotion will feature the right soap and the right washing method in the right washer. An automatic washing guide which at the turn of a wheel shows the solution to 35 washday problems, is offered dealers to use as a give-away at the clinic. First, second and third prizes of \$250, \$100 and \$50 in cash and ten other cash prizes will be awarded dealer winners in the Easy clinic display contest run in connection with this campaign. Every entrant will be awarded a \$6 case of Oxydol.

This year's spring promotion includes many of the ideas launched by Easy in the campaign in which Easy dealers in March and April of last year sold more Spindriers at \$100 to \$170 than in any similar period for the past ten years. Emphasis this year is again on selling higher priced models to upper and middle income families, by whom, an Easy survey reveals, most washable "extras" are sent to the cleaners.

A display piece, in full color, of a cut-out figure holding in her arms a model home decorated throughout with washable fabrics, has been developed to dramatize the cleaning costs that can be eliminated through use of washable fabrics in the home. Actual samples of fabrics pictured in the "washable home" are mounted on the display. A window poster also has been patterned after this display.

**UNCLE SAM IS BANKING ON HIS
BLUE CHIPS**

This great new General Motors plant is completely equipped with Bull Dog BUStribution DUCT and Universal Trol-E-Duct. When machinery is brought in and placed, light and power are instantly available anywhere.

The Blue Chip producers in defense production are users of Bull Dog flexible light and power systems

Fast production is the battle cry today! And if you look inside the key plants that are producing for America's defense, you will find Bull Dog flexible light and power distribution systems on the job.

A list of the users of these Bull Dog systems is an honor roll of the nation's greatest manufacturers. This isn't just coincidence. Industry has found that Bull Dog systems—BUStribution DUCT for power, Universal Trol-E-Duct for light, and Industrial Trol-E-Duct for portable tools or moving "loads"—are an immense asset in gaining uninterrupted speed in production.

With these Bull Dog distribution systems a new plant can be built—or leased—without waiting to figure exactly where either light or power need be. Machinery can be moved in any time—

and tapped right in for light or power *wherever and whenever* needed.

Regardless of any later re-grouping or additions of machinery, instant current is available without rewiring. Both BUStribution DUCT and Trol-E-Duct are completely salvable—thus providing means, at minimum outlay, for expansion in any form.

Write for complete illustrated bulletins on Bull Dog flexible electrical distribution systems and how they help speed up production and save money.

BULL DOG
ELECTRIC PRODUCTS CO.
DETROIT, MICHIGAN
Bull Dog Electric Products of
Canada, Ltd., Toronto, Ontario



MANUFACTURERS of Vacu-Break Safety Switches, Panelboards, Circuit Master Panels, Switchboards, Duct Systems—FOR LIGHT AND POWER

WESTERN

Send the following message, subject to the terms on back here

ELECTRIC APPLIANCE RETAILERS, U. S. A.

WITH CARLOAD ORDERS FROM RETAILERS
OF A YEAR AGO ... THE SECOND PERIOD
PROGRAM IS ALREADY A PROVED



What Kelvinator's
long-range Program of
Planned Distribution
and Manufacturing
means to the Retailer of
Refrigerators and Ranges



THE long-range Kelvinator program, which this year enters its second period, according to schedule, could only have been created by a "retail-minded" organization.

That fact is at one and the same time Kelvinator's most valuable possession and the Kelvinator franchise holders' assurance of continuing and expanding profits.

One by one Kelvinator has faced the problems of refrigerator and range retailers—haphazard

step-up pricing—too many retailers—high prices—complacent engineering and product planning—too many models. And, one by one, Kelvinator has sought solutions.

Fortunately for Kelvinator, this "attitude of Mind" is perhaps the one thing in business that cannot be copied.

It helps explain the fact that Kelvinator for nineteen forty-one is, any way you look at it—"the hot line—and the hot franchise".

which are hereby agreed to

RETAILERS MORE THAN DOUBLE THOSE
 AND STEP IN KELVINATOR'S LONG-RANGE
 SUCCESS . . .

Check These Kelvinator Franchise Advantages Against Any Other

- 1 EXCLUSIVE EXTRAS . . .** No other refrigerator offers the exclusive new Magic Shelf—the Stainless Steel Cold-Ban—the Glass-enclosed Cold-mist Freshener cooled by coils within the walls of the refrigerator. And the 1941 Kelvinator Ranges offer new, exclusive features at the lowest prices in history.
- 2 STEP-UP PLAN . . .** A logical step-up plan based on the actual retail value of each added feature. The higher priced models, in both refrigerators and ranges, are easy to sell.
- 3 NEW LOW PRICES . . .** Last year Kelvinator's new price policy revolutionized the industry. This year, step number two in our long-range program reduces refrigerator and range prices even farther, and greater values have been built into every model in the line.
- 4 HIGH UNIT SALES . . .** Last year the average of 80 per cent of all Kelvinator retailers' sales was \$160—which we believe sets an industry record. With this year's amazing step-up plan Kelvinator retailers will again sell an overwhelmingly big per cent of higher-priced refrigerators and ranges.
- 5 SIZE . . .** One of Kelvinator's most important extras is size. Six cubic foot refrigerators are now six and three-quarter cubic feet—and eights are eight and three-quarter cubic feet—thanks to Kelvinator's new cabinet construction. And all ranges have big, over-size ovens.
- 6 SELECTIVE MARKETS . . .** Kelvinator's 1940 policies, carried forward into 1941, have earned for Kelvinator the reputation of putting into actual practice—"a market for every dealer—a dealer for every market".
- 7 FEWER MODELS . . .** By concentrating on the models people really want, Kelvinator has reduced its refrigerator line to eight models—its range line to three—and thus reduced the retailer's investment to a minimum and simplified his selling problem.
- 8 SERVICE-FREE . . .** The Polar-sphere Sealed Unit has set a record for reliable performance. Of the hundreds of thousands of Kelvinator refrigerators sold last year, less than one-half of one per cent were returned to the factory for service.
- 9 REPLACEMENT SALES . . .** The new and radically different 1941 Kelvinator Moist-Master with its glass shelves and Cold-mist Freshener, offers the most powerful replacement incentive in years. And every 1941 Kelvinator is a brand new model. Not one is a relabeled carry-over from 1940.
- 10 ADVERTISING AND PROMOTION . . .** The biggest campaign in Kelvinator's history is already under way with four-color magazine advertising—key city newspaper and transcribed radio spot announcements—new style billboard posters and complete cooperative advertising materials. Selling and product literature is printed in full-colors.
- 11 STOCKING . . .** Kelvinator's Redisco Plan for 1941 provides the most flexible and liberal method of stocking refrigerators and ranges you have ever been offered.
- 12 PLANNED DISTRIBUTION AND MANUFACTURING . . .** A long-range program developed by a "retail-minded" organization to help retailers build an increasingly profitable business.

Kelvinator Division, NASH-KELVINATOR CORPORATION, Detroit, Michigan



Get
More

Get

KELVINATOR

Informative Labeling New Westinghouse Policy

An informative labeling program designed "to provide consumers with the information they want to know about electrical appliances" was announced recently by the Westinghouse Electric & Manufacturing Company's Merchandising Division. The new labels appeared on the products shown by the company at a preview of its 1941 lines of refrigerators, ranges, and other appliances.

"This informative labeling program is based on our conviction that the consumer wants to have—and is entitled to have, the complete facts about a product before making a purchase," Frank R. Kohnstamm, sales manager of the Division, said in making the announcement. "We believe that by affixing to a product a label which is truly informative and gives the beneath-the-surface details, a shopper is best provided with a basis for intelligent appraisal and comparison."

Westinghouse is embarking immediately on this program of placing on its appliances informative labels affixed by a method which makes their removal impossible unless a seal is broken.

NEPCO an Old Timer in The Electrical Field

Thirty-five years ago the National Metal Molding Company, now the National Electric Products Corporation, began serving the electrical industry of the South. At that time they were represented by a manufacturers' sales agency organization, with headquarters at New York and Chicago, known as the I. A. Bennett Company. Their southern business gradually developed, although only occasional trips were made by I. A. Bennett Company salesmen through the southern territory.

In 1913, even before the Healey Building, Atlanta, was completely equipped for occupancy, the National Metal Molding Company opened a branch office in the Healey Building, under the direct supervision of the home office at Pittsburgh. Gradually the district office in Atlanta opened branch offices and now maintains branch offices at Richmond, Virginia; New Orleans, Louisiana; Charlotte, N. C.; Miami, Florida; and Birmingham, Alabama. Similarly, the Chicago office, under the supervision of I. A. Bennett Company opened branch offices at St. Louis, Missouri; Kansas City, Missouri; and Dallas, Texas.

With distributors in principal jobbing centers throughout the entire South, the National Electric Products Corporation's business has reached proportions where even present expanded facilities and sales organization are being taxed. Further expansion of warehouse and sales organization facilities are being planned.

J. M. Moore, southeastern district manager, has been connected with the company for twenty years and has seen the company's business expand from the manufacture of metal molding and rigid conduit to a complete line of roughing-in materials for every conceivable electrical need.

Among the many nationally-known brands manufactured by this company are the following: (These brands have been popularized among the trade by the slogans quoted). Sherarduct—"It Bends"; Sherarduct Jr.—"It Bends"; National "Dilec" Wire—"Fishes Easter, Smallest Diameter"; Redeye Boxes—"Rust-proof, Uniform"; Nepconduit—"Under-floor Duct—"Melts into the Job"; A.B.C. Cable—"The Perfect Cable"; Ovalflex—"Flat"; ESS "Flexsteel" Conduit—"A light wall tubing without joints—outlet to outlet"; "Gorilla Grip"—Mechanical Connectors—"No special tools—precision"; "Canvas-Back" Loom Wire—"Does not soak up moisture nor carry

flame"; Indestructo—A rubber cord—"Indestructible"; "Plug-in" Strip—"The New Method of Circuit Wiring"; "La-in" Metal Molding—"No fishing of wires—2-4-6 wires"; "La-in" Metal Xtensionduct—"Snap-on capping"; "La-in" Metal Florduct—"Protects wires on floor surface extensions"; "4 x 4"—"A square conduit with hinged cover"; "I.P.I."—"Industrial 'Plug-in' Bus"; "I.F.B."—"Industrial Feeder Bus"; Bond-nuts—"Tighten with a grip"; and Bushings—"Will not break."



Winfield Scott Cushion

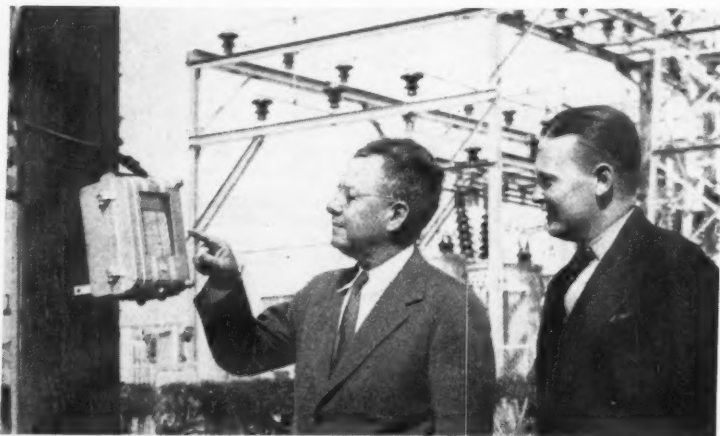
Winfield Scott Cushion, senior associate of his organization, who devoted over thirty-three intensive, loyal years of his life in the zealous effort of giving his uttermost to the building of the Industrial South laid aside his "brief case" on January 14, 1941. Mr. Cushion, born in Cleveland, Ohio, on June 27, 1883, joined this company on January 6, 1908, and spent the remainder of his life in its service, in his native city. He had been our senior vice-president for more than thirty years.

No more gracious gentleman, no more conscientious salesman of progress, ever contributed his time and energy to an ideal.

Those of his associates who still carry on can fully appraise his worth and his capacity. A friendly man, a truthful man, a very gracious soul has received a new assignment from the Great Publisher of Life.

Winfield Scott Cushion: we deplore your departure but, as faithfully as you lived and served, we sincerely believe that your exemplary life will continue to project itself as an inspiration and an ideal to scores and hundreds of younger men whom you so beneficently and kindly counseled. For the third of a century of years that you were my friend and my associate, I am profoundly grateful.

W. R. C. SMITH,
Chairman of the Board,
W. R. C. Smith Publishing Co.
Atlanta, Ga.



Lon C. Hill, president of Central Power & Light Co., inspects one of 50 General Electric CF-1 portable inkless recording voltmeters used in a \$380,000 voltage correction campaign with J. W. Darby (right) of G. E.'s San Antonio office. Results of the campaign, launched early in 1939, have been increased consumption and revenue, with the improved service an incentive for greater domestic use of electricity throughout Central's 196-town, 66,000 square mile system.

**UNIVERSAL RANGES—
backed by national promotion—
are the profit line for '41!**



1
MULY-I-HEAT CONTROLS give 101 different surface heats from "simmer" to "high". SIGNALITE INDICATORS show when current is on.

2 MAGIC EYE OVEN CONTROL, new illuminated dial automatically switches from preheat to bake.

4 SELECT-A-TROL permits setting UNIVERSAL Automatic Timer for oven, broil, or economy cooker.

3 SUPERHEAT UNITS give amazingly fast surface cooking, cut current costs to the bone.

5 SERV-A-DRAWER warming compartment is thermostatically controlled.

... because **ONLY UNIVERSAL** has the 5 "star" selling features that build real sales volume

Here's the sales sensation of the electric range business for '41—the new **UNIVERSAL**. To your customer it offers quicker, easier, more economical cooking than ever before, with results uniformly better. To you, as a **UNIVERSAL** dealer, it offers bigger profits from more and easier sales! Write or wire today for information about the **UNIVERSAL** Ranges for '41. Learn how this fast-selling line—backed by powerful national advertising—can help make this the best range you've ever had!



NEW FOR '41--the UNIVERSAL WATER HEATER

A fully automatic electric water heater in the modern, square design. Write for particulars about this new companion to **UNIVERSAL** Electric Ranges!



BACKED BY STRONG NATIONAL PROMOTION

UNIVERSAL
THE TRADE MARK KNOWN IN EVERY HOME



LANDERS, FRARY & CLARK ☆ New Britain, Conn.



Arthur E. Allen

R. L. White

Bret C. Neece

Arthur E. Allen, former vice president of the Westinghouse Electric and Manufacturing Company, was elected chairman of the board of Landers, Frary & Clark, manufacturers of Universal household appliances at a directors meeting in New Britain, Conn., on January 9. Richard L. White, treasurer of the company, was elected president. Bret C. Neece, vice president and general sales manager, was elected a director.

Mr. Allen is well-known for his outstanding service with Westinghouse in charge of merchandising. Mr. White, the new president, is one of the outstanding younger figures in the household appliance manufacturing field. The election of Messrs. White and Neece to their new, important posts emphasizes the importance being placed upon the selection of younger men of proved ability to hold important executive positions within the company.

* * *

The assignment of responsibility to D. S. Mix for Media and Publishers Relations, General Electric Publicity Department, Schenectady, has been announced by R. S. Peare, manager of G-E's Publicity Department and



D. S. Mix

Broadcasting. Under his new duties, Mr. Mix will have responsibility for the work formerly handled by the late F. R. Davis.

A native of New Haven, Conn., Mr. Mix was graduated from the Sheffield Scientific School of Yale University in 1917, joining General Electric immediately thereafter on editorial work in the Publicity Department.

Since 1932, he has devoted his time to Publicity Department training programs, personnel, and special assignments, which he will continue to handle.

* * *

The election of J. J. Nance as a vice president of Easy Washing Machine Corporation, Syracuse, voted at a recent meeting of the board of directors, was announced recently.

Mr. Nance joined Easy in August, 1939, as general sales manager.

* * *

Ralph R. Newquist has been appointed manager of the district office at Houston, Tex., Allis-Chalmers Manufacturing Company announced this week. Since joining the company in 1934, Mr. Newquist has been stationed in the district offices at Chicago and Pittsburgh, and more recently at Boston. Prior to that he was connected with several other engineering and electrical concerns. Mr. Newquist succeeds K. P. Ribble, who has obtained leave of absence for purposes of health.

* * *

Edward B. Newill, since 1937 assistant general manager of Frigidaire and from 1930 to 1937 the company's chief engineer, has been advanced to the post of assistant to E. R. Breech, vice president of General Motors Corporation, according to an announcement by E. G. Biechler, general manager.

The successor to Mr. Newill as assistant general manager of Frigidaire Division, the announcement said, is Edward R. Godfrey. Mr. Godfrey has been head of Frigidaire's manufacturing division since he became associated with the company in 1930.

* * *

G. L. Oscarson, who has been connected with the Electric Machinery Mfg. Company, of Minneapolis, for the past 18 years, has been appointed chief application engineer. Mr. Oscarson's former position as sales manager of the St. Louis District is being filled by G. N. Harris.

* * *

C. V. Linzer, who has been associated with Anaconda Wire and Cable Co. for several years, has been transferred to Atlanta, where he will be engaged in sales work under the supervision of D. E. Allen, southeastern district manager.

J. J. Mitchell, vice president in charge of sales of the Bull Dog Electric Products Company, has announced that advertising for this company is now being handled by Brooke, French & Dorrance, Inc., Detroit and New York advertising agency. Plans are being developed for a long-range expansion program to promote the complete line of Bull Dog products, including a wide variety of electrical equipment used in the industrial, commercial and residential building fields.

* * *

At a meeting of the Board of Directors of Hygrade Sylvania Corporation, Walter E. Poor was elected executive vice president in charge of all



Walter E. Poor

operations of the company, according to announcement by Edward J. Poor, chairman of the board and B. G. Erskine, president. Mr. Poor will make his headquarters at the New York City offices of the corporation, located at 500 Fifth Avenue.

* * *

Changes in district executive personnel are announced by Frigidaire Division, General Motors Sales Corporation. H. L. McGurk has been named manager of the company's Ft. Worth office to replace W. J. Jennings, who requested a leave of absence after being notified of his call



H. L. McGurk

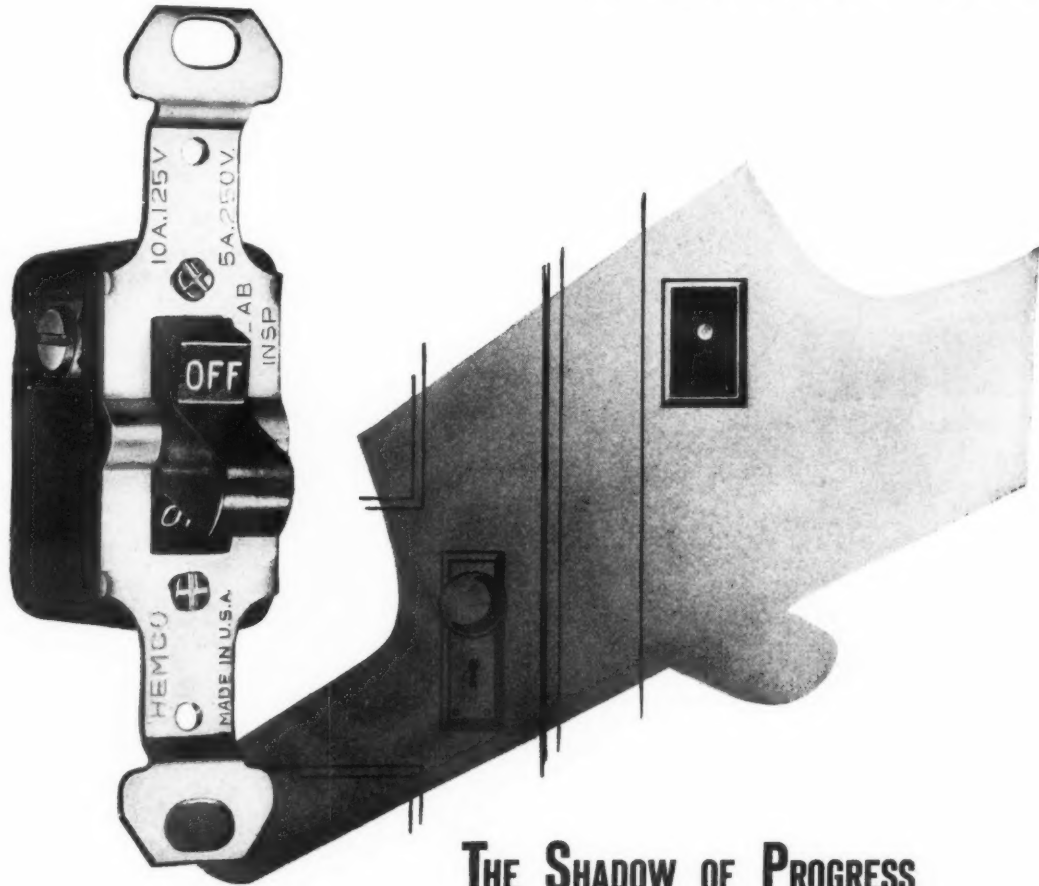
E. Carmel

to military service. Edgar Carmel, until recently branch manager in Paris, succeeds R. C. Golt as district manager at New Orleans.

From New Orleans, Mr. Golt has been transferred to Frigidaire's office in Kansas City, Missouri, where he has succeeded P. K. Abry. Mr. Abry is now located in the company's Dayton, Ohio, headquarters, where he is associated with the sales department.

EVERY OUTLET DESERVES

A BRYANT DEVICE



THE SHADOW OF PROGRESS

points to many Bryant Wiring Device improvements in the past 20 years. Even the younger electrical men will remember these developments, for instance:

SWITCHES — Tumbler, "T" Rated and Mercury Silent.

OUTLETS — Bakelite. For Clocks, Fans, Radios, Ranges, and Outdoors.

LAMP HOLDERS — Prefocusing, Lumiline and Fluorescent.

AND SENTINEL BREAKERS, INTERCHANGEABLE UNIT DEVICES, "UNILINE" STANDARD PLATES.

Bryant Wiring Device progress of *fifty-two* years is shown by the latest Bryant Catalog, Number 40. *Ask for your copy today.*



*The Bryant Electric Company
Bridgeport, Connecticut*



SOLD THROUGH ELECTRICAL WHOLESALERS NATIONALLY

Since 1901 a subsidiary of WESTINGHOUSE
ELECTRIC & MANUFACTURING COMPANY

F. C. Jones, president, The Okonite Company, (manufacturers of insulated wires, cables and splicing tapes) announced the opening of the company's sixteenth district office on January 15, 1941, at 1212 Comer Building, Birmingham, Alabama, to serve the company's rapidly growing business in the South.



Dewey A. White

Appointed manager of this new office is **Dewey A. White**, formerly sales engineer in the company's Atlanta office. Mr. White, who has been connected with Okonite for seventeen years, will have included in his south central territory the states of Tennessee, Alabama, Mississippi and Louisiana. Mr. White will handle insulated wires and cables manufactured by The Okonite Company, The Okonite-Callender Cable Co., Inc., and the Hazard Insulated Wire Works Division.

The South Atlantic territory (North Carolina, South Carolina, Georgia and Florida) will continue to be handled by **Geo. N. Brown**, manager of the company's office at 1606 Rhodes-Haverty Building, Atlanta, Ga.

* * *

Among changes in personnel announced recently by General Electric Company are the following:

J. J. Curtin, who for the last 11 years has been in charge of sales promotion and publicity work in the motor division of the Industrial Department, has been transferred to the wire and cable division of the Central Station Department at Fort Wayne, Ind. He is in charge of magnet wire sales, replacing **B. F. Ilsley**, who moved to Schenectady to be general assistant to **W. V. O'Brien**, division manager of wire and cable. **O. F. Veal** has taken over the work formerly handled by Mr. Curtin.

F. E. Fairman, Jr., has been appointed assistant manager of the Switchgear Division, Central Station Department, Philadelphia. **J. D. Hoffman**, also of Philadelphia, has been promoted to manager of sales of the equipment section in the Switchgear Division, at Philadelphia, taking over the work formerly handled by Mr. Fairman.

The appointment of **T. A. Abbott** as manager sales, Meter Division, has been announced by **F. G. Vaughn**, manager, General Electric Meter Division.

John P. Rainbault has been named

manager of the air conditioning and commercial refrigeration department of the General Electric Company effective immediately. Formerly manager of the company's electric clock section in Bridgeport, Conn., Mr. Rainbault succeeds **Stuart M. Crocker**, who was recently named a vice president concerned with customer relations.

Consolidation of the clock section of the General Electric appliance and merchandise department with the heating device and fan section has been announced by **H. L. Andrews**, vice president. **Alfred C. Sanger**, who has been manager of the heating device and fan section, with the consolidation becomes manager of clock operations as well.

* * *

Appointment of **Vale E. Freeland** as supervisor of department and furniture store sales was announced recently by **Frank R. Kohnstamm**, sales manager of the Westinghouse Merchandising Division.

Other personnel changes announced by Westinghouse include the following:

W. A. Sumner has been appointed manager of distribution transformer engineering at Sharon, Pa., it is announced by **J. K. Hodnette**, engineering manager of the Transformer Division.

Homer B. West has been appointed manager of manufacturing in the transformer division at Sharon, Pa., it was announced recently by **H. V. Putman**, manager of the division.

A. R. Rutter has been appointed assistant manager of the engineering department of the meter division at Newark, N. J., it was announced recently by **Tom Turner**, manager of the division.

G. W. Honsberger has been appointed manager of the Westinghouse Louisville, Ky., office, **J. K. B. Hare**, Central District manager, announced. Mr. Honsberger succeeds **T. W. Voils**, who has served as manager of the Louisville office for 21 years prior to his death last December.

* * *

Arthur G. Kimball, president of Landers, Frary & Clark, New Britain, Conn., manufacturers of the "Universal" line of electrical appliances, died December 23 at the New Britain General Hospital after a brief illness.

Mr. Kimball, who was widely



Arthur G. Kimball

known as an industrialist, had been president of Landers, Frary & Clark for 22 years. He was also a director of the National Electrical Manufacturers Association.

Born in Evanston, Ill., in 1880, Mr. Kimball received his education in schools of Chicago and at the age of 18, he went to work in the Chicago office of Landers, Frary and Clark.

* * *

Fred R. Davis, a founder of the Audit Bureau of Circulations and advertising space buyer for the General Electric Company at Schenectady for 35 years, died December 26 at his home in Schenectady after an illness of two years. He was 64 years old. For many years he supervised the expenditure of more than a million dollars annually for newspaper and magazine space.

A man of scientific training himself, Mr. Davis was a pioneer advocate of accurate measurement in advertising and helped found the Audit Bureau of Circulations in 1914. He served as a director from that date until his death and since 1927 had also been first vice president of the organization.

Mr. Davis was born in Adams, Mass., attended Union College in Schenectady, and was graduated from Worcester Polytechnic Institute in 1900 with the degrees of B.S. and M.S. in engineering. In 1901, he entered the G-E organization as a test student and in 1902 went to Fort Wayne, Ind., as publicity manager of the Fort Wayne Electric Company. In 1905 he joined the G-E advertising department in Schenectady.

* * *

On January 1, **George Murray Brooks**, New York City, general counsel and executive vice president of The Okonite Company, died at the Columbia Presbyterian Medical Center after several weeks' illness. Mr. Brooks was the head of the company's legal department.



George M. Brooks

Mr. Brooks, who was born in Dalton, New Hampshire, on May 5, 1857, was well-known in the field of corporation law. He was a member of the American Bar Association, New York State Bar Association, New York County Lawyers' Association, as well as a member of the Bankers' Club and the Yale Club of New York City.



What Make Of Refrigerator Do You Prefer?



**MORE PEOPLE PREFER
A GENERAL ELECTRIC THAN
ANY OTHER REFRIGERATOR . . .**

According to recent national magazine surveys among refrigerator owners and prospective buyers, over 50% more people prefer General Electric than any other make.

G-E is tops in preference *because it's tops in performance . . .* and top performance means greater customer satisfaction, minimum service calls, and greater profit.



*It's G-E
for Me!*

News!

A beautiful big new SEVEN CU. FT. G-E for the price of last year's "Six." Here's refrigerator news that's making the headlines! In addition, new G-E models have Perfected Conditioned Air, New Butter Conditioner, New Dry Storage Drawer, New All-White Textolite Door Strips, along with many other innovations.

Research keeps General Electric years ahead!

GENERAL  ELECTRIC

New Products

Faucet Water Heater

An instantaneous type electric water heater that mounts directly upon the water faucet is announced by the Electric Heater Company, of Bridgeport, Conn. According to the manufacturer, about three seconds is required to make cold water hot by passing it over an electric coil. The faucet handle operates the electric switch which turns on the current. The faucet handle is arranged so that when turned in one direction hot water will flow, while a turn in the opposite direction will permit cold water to flow. A small control valve located on the side of the heater permits adjustment of the hot water temperature to any desired value. The manufacturer claims that the heater will provide hot water at 140 F. at the rate of thirty-three gallons an hour.

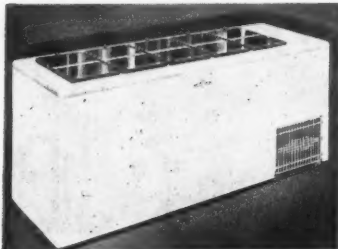
The heater is not a plug in type. It must be wired in permanently and in some cases special wiring may be required. There are four models rated at from 110 to 220 volts and requiring wire sizes from No. 8 to No. 4. Heaters operate on a-c or d-c.

The same manufacturer also announces a multiple faucet heater that can be installed out of sight and which delivers hot water to all the faucets in the house. Like the smaller units, this one consumes current only when a faucet is in operation. Both types of faucet water heaters are listed by Underwriters' Laboratories, Inc.

Frigidaire Ice Cream Cabinets

Use of its successful rotary type compressor in seven utility model ice cream cabinets is announced by Frigidaire Division, General Motors Sales Corporation, for its 1941 line. Of the 16 cabinets which make up the Frigidaire ice cream cabinet line for 1941, seven are the utility models with sealed rotary-type compressors, which also are available with open-type reciprocating compressor units for use with direct or odd cycle current; four are portable models with the open-type reciprocating mechanism; and five are remote models with reciprocating units remotely installed.

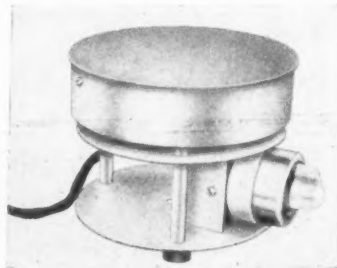
Utility models introduced for 1941 are lower in height for easier dispensing. A new 10-hole utility cabinet, shown here, has a capacity of



eight 5-gallon and two 2½-gallon containers. All cabinets in the entire line are of all-steel construction which Frigidaire points out prevents warping and buckling. In addition, cabinets are sealed tightly against air, vermin and moisture and are insulated with genuine vegetable cork-board.

Chromalox Hot Plate

Chromalox announces the ROPH hot plate for efficient, continuous heavy-duty, laboratory work - heat treatments, evaporations, dehydrations and digestions. Chromalox design with the resistor embedded in refractory in channels in bottom of special, non-warping, alloy top plate assures uniform surface temperature. Sturdy supporting frame with heat baffles incorporated to provide cool



operation of base mounted 3-heat switch and entire understructure - easy portability. Will not burn or scorch wood surfaces—molded plastic feet. Furnished with 6 ft. rubber cord and plug listed by the Underwriters' Laboratories. Hot plates are supplied for either 120 volts or 240 volts at ratings of 660 watts to 2000 watts inclusive. For further information, write Edwin L. Wiegand Co., Pittsburg, Pa.

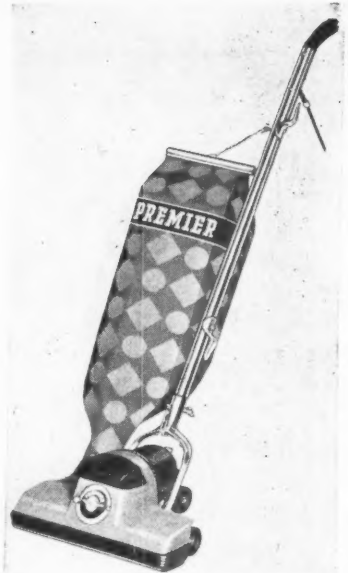
Three New Fluorescent Lamps

The addition of three new fluorescent lamps to the growing line of Mazda fluorescent lamps is announced by the Westinghouse Lamp Division, Bloomfield, N. J. Daylight color in the 100-watt lamp is now available in addition to the present 100-watt Mazda F lamp in the 3500° white. The 14-watt Mazda F lamp, primarily used for train lighting, can also be obtained in the daylight color. It can be used to some extent in general and decorative lighting where the shorter bulb length is desired and in portable floor lamps. The new soft white color is now available in the 15-watt 18-inch lamp.

For further information write the Westinghouse Electric and Mfg. Co., Lamp Division, Bloomfield, N. J.

Premier Vacuum Cleaner

A new leader in the Premier 1941 line is this low-priced Floor Model 42 which has both new styling and new features. It is smartly designed in maroon and gray—with the colors of the bag matching the durable crinkle finish on the machine itself. This sateen bag with its dirt trap,

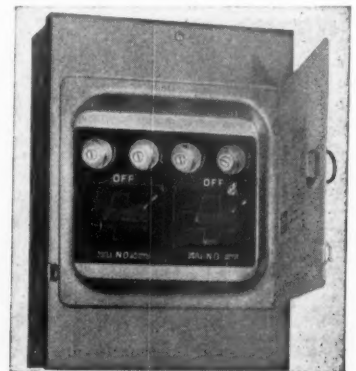


the ball-bearing, motor-driven brush, and the Hi-Power, ball-bearing motor are all improved Premier features. A particularly important innovation on this model is the new Simple-Matic nozzle which requires no adjustment to clean rugs and carpets of various thicknesses. This cleaner is also equipped with a dirt-finding Search-Lite, a molded rubber furniture guard, the fingertip switch and non-squeak casters.

Combination Range Switches

A redesigned combination range switch has been announced by the Square D Company, Detroit, Michigan. Catalog No. 33582 has 60 ampere two-pole main and range circuits, and four one-pole plug fusible circuits. Devices with parallel main and range switches are available. All boxes and surface covers have aluminum finishes as standard; flush covers are gray enamel.

Solderless connectors are furnished throughout. The strong, light weight bakelite base may be reversed if it is desired to have the plug fuse circuits at the top. The interior may be removed by loosening one screw. There are 60-ampere tap-offs

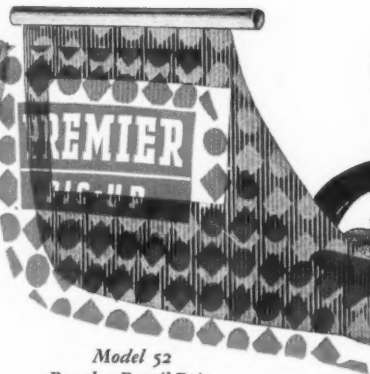


THE FORECAST: "MAROON AND GRAY SWEEPING THE COUNTRY!"

Premier's NEW LEADER

Turns Low Price into Big Volume.. Full Profits

It's the 1941 "MATCHED SET"



Model 52
Regular Retail Price
\$14.95

Only **\$39.95** AND OLD CLEANER

WITHOUT OLD CLEANER PRICE IS **\$44.95**

Approved & Assigned
★ 977
Good Housekeeping
Institute
GOOD HOUSEKEEPING MARK

Prices Slightly Higher
West of the Rockies

WINS WOMEN WITH

- ★ NEW STYLING!
- ★ NEW FEATURES!
- ★ NEW \$14.50 SAVING!

here's a business forecast too! A new leader—as new and different as its maroon-and-gray crinkle finish—is a sure way to stage a clean-up for Premier dealers. This 1941 "Matched Set"—a \$54.45 set that is bargain-priced at only \$39.95 and the customer's old cleaner will make the same instantaneous hit with the public as it did with dealers at the Major Appliance Show. Both cleaners have motor-driven brushes and the

Floor Model has a Search-Lite as well as Premier's brand new Simplo-Matic Nozzle! Bigger business with full profit is yours with this 1941 "Matched Set!"

...up—with big...
...ame and big...
PREMIER STEALS SHOW
CHICAGO, Jan.—Premier's 1941 line of cleaners grabbed dealer interest in a big way at the Major Appliance Show. Biggest hit was the sensational Fully Automatic Nozzle, a real innovation. With the equally new Simplo-Matic and Duo-Matic Nozzles, Premier dealers have a natural set-up to sell up—with bigger volume and bigger profits looming ahead...



Model 42
Regular Retail Price
\$39.50

PREMIER DIVISION
Electric Vacuum Cleaner Co., Inc.

PREMIER DIVISION, ELECTRIC VACUUM CLEANER COMPANY, INC.
1734 Ivanhoe Road Cleveland, Ohio
Rush full information about the \$39.95 Matched Set, and the complete Premier 1941 Line featuring the new Fully Automatic, Duo-Matic and Simplo-Matic Nozzles.

NAME _____
ADDRESS _____

A Brilliant New Line of



\$219⁵⁰
 F. O. B.
 Factory
 Chicago
 INSTALLATION EXTRA
 Other Models as low as \$89.95
 at the factory



New Tiffany Stainless-steel Copperclad 3-piece utensil set included with this new range.

Lowest Prices, Greater

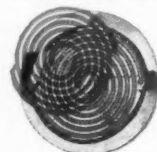
ONCE MORE Hotpoint shows the way to bigger volume and bigger profits with two brilliant leaders in a greater-than-ever line. Seven sensational new electric ranges, all with the *Measured Heat* that brings new standards of performance to electric cooking. See the complete line, then ask about Hotpoint's helpful, exclusive sales

News! Price Reduction on Calrod Electric Range Replacement Units!

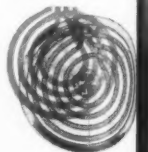
UTILITY SIZE **NOW \$5.95**
 WAS \$7.00
 GIANT SIZE **NOW \$7.95**
 WAS \$9.00

(Including stainless steel adapter rings)

Surveys show 2½ million electric ranges are ripe for modernization. Dip into this rich new market with the Calrod Replacement Plan. You get a 2-way profit by (1) modernizing old ranges and (2) making new range sales. A minimum number of adapter rings are needed to fit practically all makes of ranges.



OLD



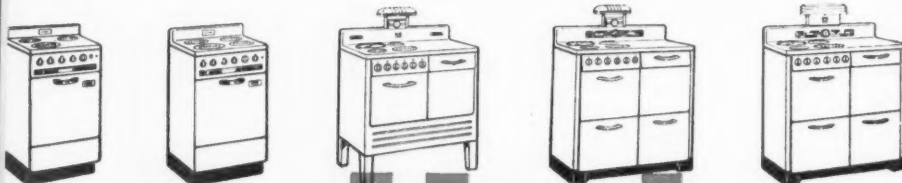
NEW

You Can See The Difference. The Lighter, Faster, Self-Cleaning Calrod for '41—A Great Sales-Opener!

The NEW TIFFANY Super De Luxe Model

Acknowledged Style Leader Among Ranges

- New Hi-Speed Calrod Surface units, each with 5 Measured heats.
- Hi-Porcelain enamel inside and out.
- Beautifully styled Twin Venetian Lamps.
- Built-in Electric Oven Timer-lock and Time Chime.
- Oversize, All-Purpose, Flavor-Seal Oven with interior light.
- New illuminated Switch Dials.
- Two Appliance Outlets—one Timer controlled.
- New Calrod Baking Unit with new Heat Deflector.
- New Duo-Speed Broiler—with new Broiling or Roasting Pan.
- Warming Compartment for foods and dishes.
- New 7-Quart Flavor-Seal Thrift Cooker with 5-Heat Calrod Unit.
- Tiffany Set of Copperclad, Stainless-Steel Utensils.



THE NAME
 EVERYBODY
 KNOWS

Hotpoint

HOTPOINT ELECTRIC RANGES

Values in 31 Years....

...otion plan, which includes a new
...gram for selling with motion pic-
...s. Do it today — now! Edison
...eral Electric Appliance Co., Inc.,
...West Taylor Street, Chicago, Ill.

Thoughts at a Glance

It has been said that every young man in America is granted three birthrights — ideas, ideals, and a belief in opportunity.

It always has seemed to me that so long as a young man has these three convictions, he can forge ahead. The same thing is true of a business organization: so long as the men responsible for its direction retain their belief in the value of ideas, in the integrity of ideals, and in the genuineness of opportunity that organization can progress. It is a sign that it still is young in spirit.

From the beginning, Hotpoint policy has been marked by this youthful enthusiasm and honesty of conviction. 32 years of leadership has established the fact that Hotpoint is forever aggressively abreast of the times with new and always better products; that its policies of fair dealing are simple and sincere; that the millions of dollars Hotpoint has invested in local and national advertising prove a belief in even greater opportunities awaiting us all.

People never are old so long as they can change with the changing times. Hotpoint is 32 years old in tradition, but forever young in ideas, ideals and a belief in opportunity. Three good reasons why Hotpoint is today "the name everybody knows."

Al L. ...
Vice-President

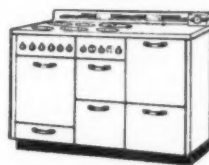


\$99⁹⁵
F. O. B. Factory Chicago
INSTALLATION EXTRA

The NEW CENTURY Price Leader

Hotpoint High Quality At A Real Low Price

- 3 new improved Hi-Speed Calrod Surface Units, each with 5 Measured Heats.
- New Radiant Broiler Unit.
- New Indicating Switch Buttons.
- Oven Signal Light.
- 5-Heat Thrift Cooker with Flavor-Seal Lid.
- Oversize, All-Purpose, Flavor-Seal Oven.
- New Calrod Baking Unit with new Heat Deflector.
- All-Porcelain enamel inside and out.
- Automatic Oven Temperature Control.
- One Large Sliding Storage Drawer.
- Double Size Tilt-Out



ELECTRIC RANGES

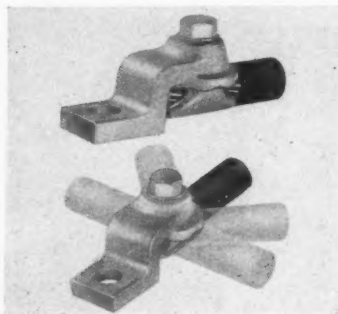
REFRIGERATORS • WAXER HEATERS • WASHERS AND DRYERS • CLOTHES DRYERS • AUTOMATIC DISHWASHERS • ELECTROLUX

after the main fuses for water heater circuits or mains extension.

The bakelite fuse-breaks in these devices have test holes so that fuses may be tested without removing the fuse puller. The main and range fuse-breaks are entirely non-interchangeable, and have the words "MAIN" and "RANGE" molded in the bakelite so that the identification cannot be destroyed.

Burndy Versilug

To make cable connections easier and to reduce costs, Burndy Engineering Co., New York City, has introduced the "Versilug," a new idea in electrical connectors. The



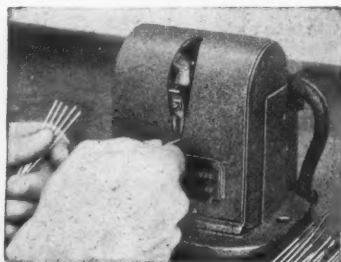
new element is the rotatable cable clamp. Conductors can be joined to the connectors at any angle. The photograph demonstrates this simple principle on a terminal connection.

Each size accommodates a range of conductors and only six sizes are necessary to take conductors from No. 8 stranded cable to 1,000 MCM.

"Hot Blade" Wire Stripper

A new type of wire stripper, one that cleanly and quickly burns the insulation, is announced by the Ideal Commutator Dresser Co., Sycamore, Illinois. This device is especially suited for stripping cotton, silk and rubber coverings from fine stranded or solid wires. There is no possibility of cutting strands, or nicking, scraping or injuring the wire in any way, for the blunt blade cannot harm the finest wires.

In operation, wires are merely inserted between the electrically heated blades in the stripper head. Pressing the foot pedal brings the blades against the insulation and instantly two parallel grooves are burned right down to the conductor. The grooves are completed with a slight twist to



the right or left, a pull removes the insulation leaving a clean edge. With a little practice, the push and pull become practically a single movement. The shavings fall into a water drawer where any burning particles are quickly extinguished.

Each blade has an individual heat control and transformer so that the burning temperature of each blade can be separately raised or lowered as desired, depending upon the type of insulation and thickness. Distance between blades, and length of stripping is adjustable. This Stripper is sold for installation on present production line bench or table. Parts as furnished include standard head, control box with transformer, water drawer, foot rest, pedal and connecting rod. 110-120 volt, 50-60 cycle a-c standard. Other voltages and frequencies available.

New Colt Controls

Another important member of the new line of Colt motor Controls are the Colt Magnetic A. C. Contactors, Bulletins 501 and 502, general purpose alternating current contactors, furnished in Sizes 0 and 1. They provide a safe and convenient method of remotely controlling electric cir-



cuits from one or more push button stations or pilot devices. Colt contactors are horsepower rated for motor control and can be employed where overload protection is not required or is otherwise provided for. They are suitable for handling single phase or polyphase AC motors, or for use as flexible relaying devices for control system such as are used in machine tools, switchboards and special control panels.

An important feature of the Colt Magnetic Contactors is the 3-point ball bearing suspension of the movable electro magnet assembly, reducing friction to a minimum and guiding contacts into correct alignment. For complete information, write Electrical Division of Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.

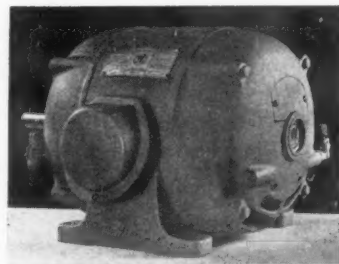
New Conduit Fittings

A combination of electrical conduit fittings that can be handled in the same manner as a mitred stove-pipe elbow was recently announced by Johns-Manville. A box of these fittings with a shipment of Transite asbestos-cement ducts prepares the contractor for practically any change in direction with a minimum of lost time and materials, according to the company's announcement. Consist-

ing of curved segments, deflection couplings and sweeps, the fittings facilitates the by-passing of obstructions not anticipated in the design period and overcome the expense and delay of special fittings. The fittings permit changes in direction in one or more planes in a very short distance; also the assembly of a spiral type of bend where it is necessary to change direction slightly in one plane and then swing into another plane. Long radius changes of direction can be made when two or more of the fittings are separated by straight sections of duct of the desired length.

Smaller Induction Motors

New open-type sleeve-bearing squirrel-cage induction motors designed especially for general purpose drive applications such as machine tools, pumps, auxiliary drives, and



others, are announced by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. These type CS motors are available in ratings from 1/2 to 5 horsepower, at speeds from 875 to 3600 rpm, for operation on 110,220,440, and 550 volts, 2 and 3 phase a-c.

More attractive and compact than ever before, the new motors are also strong mechanically. Rigid complete-cast frames maintain constant air-gap between stator and rotor, assuring high efficiency operation. Frame improvements include new sealed sleeve bearings having a combination vestibule and felt washer seal, and a larger oil reservoir capacity. Oil filler cups may be inserted on either side of the motor.

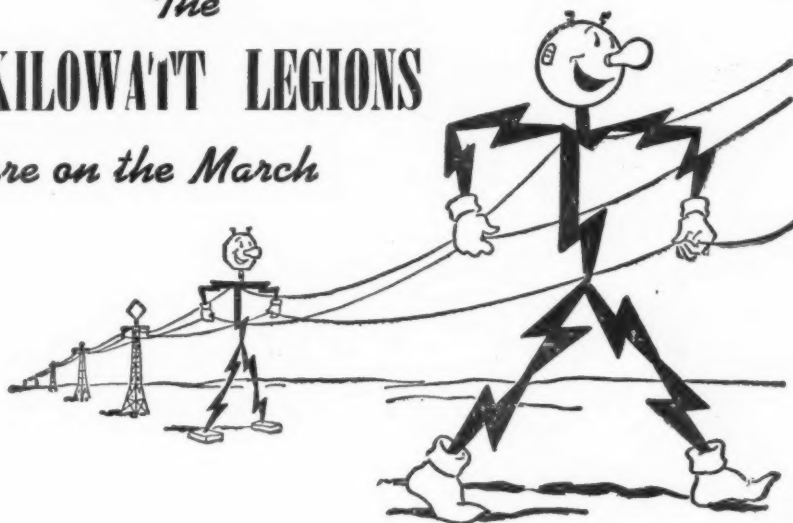
New wire insulation gives maximum dielectric strength, strength, toughness, and flexibility. Combination slot cells, with reinforced cuffs, protect windings from abrasion, and coil ends are taped for reinforcement against strains of full voltage starting. All motors are dynamically balanced, and windings are given a high-voltage radio frequency test.

Then new CS motors meet requirements of the latest NEMA standards, which became effective last Oct. 1.

Wagner Noflamol Transformers

Wagner Electric Corporation announces a new type transformer known as the Wagner Noflamol Transformer. Wagner Noflamol transformers are filled with a non-inflammable synthetic liquid developed as an improvement over regular transformer oil. Because of the non-

The
KILOWATT LEGIONS
are on the March



Stout, sturdy poles and towers, thousands of them, make the highways over which legions of Kilowatts march. These mighty lines run straight as the crow flies to speed the Kilowatts in their continuous service to factory and home . . . day and night throughout every year.

Pole lines have been built with foresight. Their standards have been set deep and strong to support the tonnage of over-size wires. These lines have been constructed not only to meet immediate demands but also to meet the demands of emergencies when they appear.

The National Defense Program is an emergency measure. As time goes on it will mean more and more work for Industry. The demands for electric service will be greater. The Kilowatts will be called upon for heavy duty . . . and truly, there is no need for alarm because the Kilowatts ARE READY.

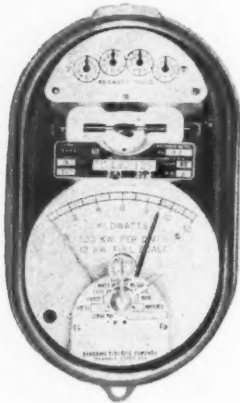
OKLAHOMA GAS AND  ELECTRIC COMPANY
An Oklahoma Institution • Established, Oklahoma Territory, 1902

J. F. OWENS, PRESIDENT

inflammable characteristics of this liquid, these transformers can be installed indoors without the use of fireproof vaults. In addition to this saving on installation expense, several other advantages are set forth by the manufacturer. For additional information write direct to the Wagner Electric Corporation, St. Louis, Mo.

Combination Meter

Consisting of the Sangamo Type J Watthour Meter and the Lincoln Type WD Watt Demand Meter, the new Type JWS meter combines two standard meter elements in a single unit, with a single set of terminals. It was designed especially for watt-hour meter applications where



mounting space is limited, or where an existing socket installation makes no provision for a separate demand meter.

Type JWS meters fit standard watt-hour meter sockets. Supplied in singlephase construction, with cast aluminum base and weatherproof cover, these meters are suitable for either indoor or outdoor service. Complete description in Lincoln Bulletin W-6. Sangamo Electric Company, Springfield, Illinois.

"Snap On" Fluorescent Channel

The new Wilson Fluorescent Channels for fluorescent lighting may be had in either the one-lite or two-lite "V" models, finished in scratch brushed rust-resisting zinc-coated steel, with the exclusive flush "Mitered" snap-on covers and screw-driver snap release, which makes it easy to assemble or remove.

Units are available in 4, 6, 10 or 12 foot sections, eliminating odd-length waste. The channels are designed for standard sockets, starters, and ballasts for 12, 24, 36, and 48 inch fluorescent lamps. These channels are ideal for flush mounting in plaster, or may be mounted directly to ceiling trusses, or suspended with chains or conduit. Low prices, good looks, and a full line of Underwriters Approved accessories are some of the manufacturer's claims.

The Wilson line consists of 27 reflectors carried in stock for immediate delivery, which can be used on both the one- and two-lite channels,

and obtainable in specular Alzak or high-temperature enamel finish. For further information, write Wilson Lighting, Inc., Chicago, Illinois.

G-E Over-Current Relay

A new line of high-speed overcurrent relays to shorten voltage dips and help maintain system stability has been announced by the General Electric Company. Listed as Type PJC, the new unit supersedes the Type PHC relay.

Both compactness and appearances have been improved in the new Type PJC. Wide calibrating range and high overload capacity make the relay easy to apply.

A feature of the new unit is its low burden, made possible by careful design of the magnetic circuit and moving assembly. A high dropout of 90 per cent, continuous and stepless adjustment, and convenient resetting are other features.

The relay is a single-phase unit, 2½ inches wide, 5 inches high and 4½ inches deep with removable studs. The base and cover are of moisture- and acid-resistant Textolite—easy to keep clean. A glass-front cover, seated against a gasket in the base, provides protection against dust.

Twenty Years of Lighting Progress

(Continued from page 42)

latest method is to make the trough of a matte aluminum finish with a parabolic contour, which further increases the comfort by reducing the troffer brightness. It is interesting to note how much of the available ceiling area becomes luminous in such types of installations.

It is entirely possible that we may sometime see the day when there will be a more general use of fluorescent lamps for making entire ceilings luminous, and of average, equal, low brightness. This is well exemplified by a recent installation in the Commonwealth Edison Company where literally the whole ceiling was constructed into a lighting element, approaching still closer to outdoor lighting conditions, as we might find them on an over-cast, cloudy day. In still another installation, highly decorative coffers using colored fluorescent lamps were used to light a large auditorium, obtaining virtually white light for the first time by combining different colors of fluorescent lamps.

A lot of water has gone over the dam since those signally important experiments in the value of adequate school classroom lighting were undertaken in Tusculumbia, Alabama, during the early 30's. At that time, after three years of study and experiment, it was

learned that the scholastic standing, as well as the physical well-being of the student, was very greatly dependent upon the adequacy of the lighting provided in the classroom. Since that time many other tests have been conducted elsewhere, along similar lines, all of which pointed to the necessity for much higher levels and quality of illumination.

The recommended standards of school lighting practice today calls for a very minimum of fifteen foot-candles in average classrooms and, preferably, thirty or more foot-candles in sight-saving classrooms. The fluorescent lamp again comes to the rescue in filling the need for these higher levels. Undoubtedly, new standards of school lighting will be prepared in the near future, based upon present, active experiments. One fluorescent installation, using a variation of the troffer was recently used in bringing 50 foot-candles of daylight lighting to a Cleveland, Ohio, public school classroom.

In the commercial field, fluorescent lamps found many noteworthy applications for both general and supplementary lighting. Considerable knowledge was gained from 1920 to 1940 regarding the most effective means of applying lighting to merchandising establishments. These principles were incorporated into a story, appearing under the heading of "Three Second Selling," which went on to elaborate upon the fact that the more a customer saw, the more she bought; and how much she saw was largely dependent upon how high a level of illumination was attained in the store, the use of highlights and shadows, spotlights, downlites, etc.

Furthermore, the story told how this modern age was one of speed so that in order for a merchant to put his story over to fast-moving eyes, it was necessary to get the message to her in about three seconds of time or not at all. It was later shown how vital a part good lighting played in this drama of selling to "eyes." Fluorescent lighting equipment, either alone or in combination with specially designed incandescent fixtures, has done much towards enabling the merchant to attract more customers to his store, and serving them better when they get inside.

Store front modernization is another development closely allied to the lighting of store interiors. For

(Continued on page 76)

Who's Interested In Georgia?

WE ARE—for one. And you ought to be too, if you are a manufacturer, wholesaler, jobber, manufacturer's representative, retailer, or distributor of household electrical appliances.

Because?

Because the people of Georgia really use their electric service. In 1940, for instance, the average use of service in Georgia homes was higher than for any state east of the Rocky mountains. In the homes served by the Georgia Power Company, the average consumption was 1,526 kilowatt hours. The gain over the 1939 average of 1,446 kilowatt hours was a round 80 kilowatt hours per customer.

Now get out your slide rule or pencil and paper (if you don't use a slide rule) and figure out what it takes for 200,000 residential customers to increase their consumption 80 kilowatt hours each.

Answer: A whole lot of appliances.

Have the people of Georgia bought all the appliances they're going to buy? Well hardly.

They've just gotten a good start. They've bought just enough appliances to get into the nice low blocks of the rate. (In 1940 they paid an average of 2.75 cents a kilowatt hour—2.92 in 1939). They like what they've had so far and they want more.

In 1940 the Georgia Power Company sold \$2,800,000 worth of appliances, approximately; we'll do more this year. But we don't sell all the appliances, or even half. We don't try to.

Come on in. The water's fine:

GEORGIA POWER COMPANY

protect

PRODUCTION CIRCUITS

WITH WESTINGHOUSE SAFETY SWITCHES

SAVE MAINTENANCE
EXCLUSIVE DIAMOND-POINTED BREAK JAW
KEEPS ARCING OUTSIDE CONTACT AREA

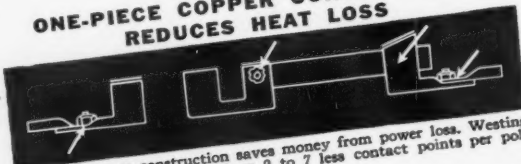


The ordinary way.
Arc travels across switch jaw.



The Westinghouse way.
Arc outside contact area.

SAVE POWER
ONE-PIECE COPPER CONSTRUCTION
REDUCES HEAT LOSS



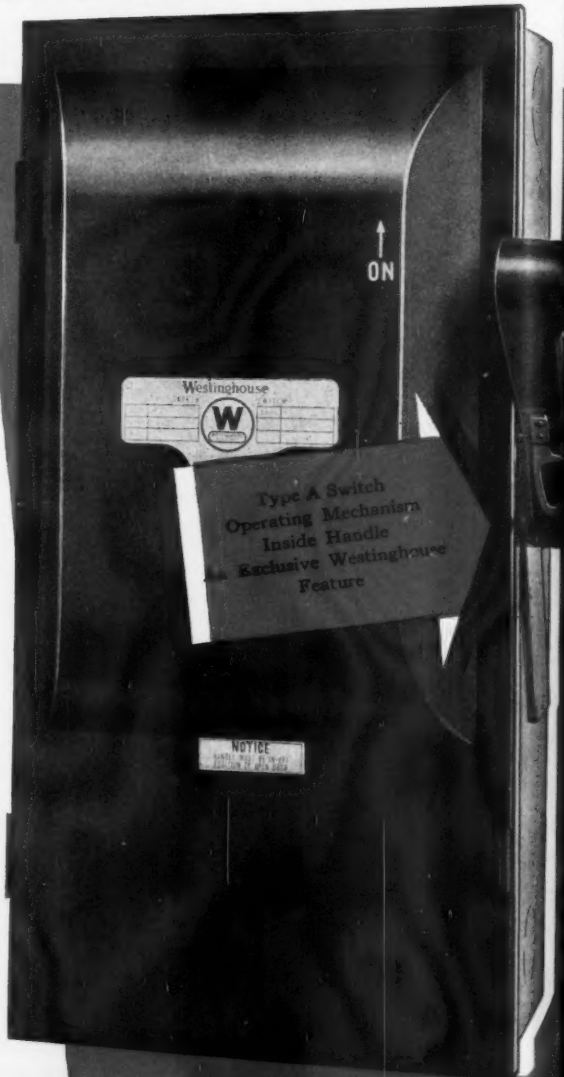
One-piece copper construction saves money from power loss. Westinghouse safety switches have from 2 to 7 less contact points per pole.

THESE FEATURES MEAN EASIER INSTALLATION
-LOWER MAINTENANCE

- Concentric knock-outs, top, bottom and both sides
- Solderless lugs
- Reinforced fuse clips assure maximum fuse contact and reduce heating.
- Warpproof, moistureproof Micarta crossbar
- Steel parts cadmium-plated to resist rust and corrosion
- Wearing parts of operating mechanism heat-treated for longer life
- Door can be pad-locked to prevent unauthorized operation
- Switch operating mechanism inside handle on Type A leaves ample wiring space, prevents damage to conductor insulation
- Non-carbonizing composition base
- Quick-make, quick-break on Types A and C minimizes switch burning.

WESTINGHOUSE ELECTRIC & MFG. CO.
EAST PITTSBURGH, PA.

J-21147



Type A Switch
Operating Mechanism
Inside Handle
Exclusive Westinghouse
Feature

NOTICE

Westinghouse offers a complete line of safety switches: Fusible and nonfusible; Types A and C for motor circuits and general use, Type D for general use; 30 to 1200 amperes, 125 to 600 volts.

Westinghouse



M

FOR PRODUCTION INSURANCE buy Westinghouse

**TIME SAVERS
FOR INDUSTRY**



WESTINGHOUSE "DE-ION" LINESTARTER

Magnetic Across-the-line
Starter
CLASS 11-200

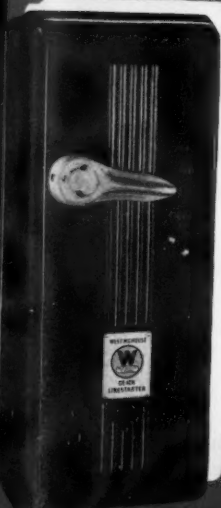
Push-button operated—built-in or mounted separately. Small, compact construction saves space. Bi-metal overload protection—hand or automatic reset. "De-ion" protection for contacts reduces maintenance. Vertical magnet operation speeds contact opening and prevents accidental operation.



WESTINGHOUSE AB-1 BREAKER

For Circuit Protection

Eliminates switch and fuses. Bi-metal overload protection. "De-ion" protection for contacts. Saves maintenance time and production time—circuit outages can be restored by operator. No live parts exposed. Door opens only when switch is in "Off" position. Occupies approximately 40% less space than switch and fuses.



WESTINGHOUSE COMBINATION LINESTARTER

For Motor Control and Circuit
Protection
CLASS 11-206

Magnetic motor starter—motor-circuit switch—motor overload protection—nofuse circuit protection—all in one unit. Bi-metal gives permanently accurate overload protection. "De-ion" quenchers protect contacts—save maintenance. Four-in-one Unit saves installation time—saves space—saves wiring—provides greater protection for operators.



WESTINGHOUSE "DE-ION" MOTOR WATCHMAN

Manual Across-the-line Starter
for Motors up to 7½ hp.
CLASS 10-100

Quick-make, quick-break toggle action prevents "teasing" contacts. "On," "Off," "Tripped" positions self-indicating. Bi-metal disc overload protection. "De-ion" protection for contacts. Ample wiring space. Rust-resisting parts. Silver contacts. Key-hole mounting for quick, easy installation.

Get your nearest Westinghouse Sales Office or Distributor

Motors and Control

(Continued from page 72)

a new or old business, a modern luminous type of building instantly focuses public attention unforgettably.

A few years ago many of the larger glass companies commenced to manufacture certain varieties of structural glasses, both opaque and translucent, particularly adaptable to this program. However, by far the greater proportion of stores dressed themselves up with the opaque varieties alone, so that very little of the translucent or luminous types were used. The reason for this was essentially on account of the greater installation and operation cost for the latter system, requiring the installation of incandescent lamps, back-of-glass. It is expected that the fluorescent lamp with its lower cost of operation will sooner or later answer this objection.

Fairs Stimulated Lighting

The spectacular and artistic effects demonstrated at the New York and San Francisco expositions, which closed last year, stimulated floodlighting as a means of publicizing buildings and the companies identified with them. The United States Tobacco Company's plant at Richmond, Va., the Ottawa Street Power Station at Lansing, Mich., and the General Electric Building, New York City, are examples of such installations. Color plays a prominent part in all of these installations, utilizing both incandescent and fluorescent lamps.

As we move out of the visible into the invisible portion of the spectrum, we find that the past year saw many advances in techniques and materials for utilization of "near" ultraviolet light to activate fluorescent chemicals for decorative and utilitarian applications. A 250-watt Purple X filament lamp was developed for use where small amounts of ultraviolet and intermittent burning are permissible. It has a red-purple bulb and may be operated directly on standard lighting circuits. This lamp is in addition to the standard 100-watt, black-lite, mercury sources developed previously.

Among the fluorescent materials made available during 1940 were improved fluorescent plastics, lacquers, dyes, etc. Carpets having patterns of fluorescent dyes found promising applications in theatres and fluorescent murals were included in several theatre relighting programs. Illuminating engineers

quickly discovered that fluorescent lacquers and paints, when applied to artist's sketches, were most effective in illustrating the nighttime effect of luminous store fronts and other lighted displays to prospective customers.

New Germicidal Lamps

Latest in the germicidal lamp family is the 30-watt source, identical to the 36-inch standard fluorescent lamp except for the omission of the phosphor coating, and use of a special glass which allows the bacteria-killing ultraviolet to pass through. The line also includes the 4, 5 and 15 watt germicidal lamps.

An even more effective use of this lamp can be made by directly irradiating the upper half of the room from standard types of indirect lighting luminaries. With this method, each watt input of the germicidal lamp system per 100 cubic feet of room volume will provide a bactericidal effectiveness equivalent to 100 changes of air per hour. For an average sized office, this means that a single 30-watt germicidal lamp will reduce the bacteria count as much as could be obtained by opening all of the windows on a breezy day, assuming the incoming air to be free from bacteria. This bactericidal effectiveness could be secured at a lamp and energy cost of only about 1/2 cent per hour.

A large New York hotel is building 50 portable units each with eight 30-watt germicidal lamps to sterilize bathrooms. Germicidal lamps have also been employed to reduce the number of bacteria in cotton used to fill mattresses and several installations have been made in walk-in meat coolers. Successful experiments seem also to have been made in the field of milk sterilization which might very well mean that later we shall abandon present methods of milk pasteurization.

The smaller germicidal lamps have been used chiefly for sterile storage cabinets. The 4 watt lamp has also been used for sterilizing toilet seats, in vacuum cleaners, and in hand sterilization units.

The use of incandescent filament lamps as sources of infrared radiation for drying, baking, heating, and evaporating moisture in much shorter periods of time than was heretofore possible with the old conventional type of bake oven methods has become increasingly popular. Many applications were made where heat was required for

softening, expanding, or treating materials. The line of drying lamps was increased to include three sizes—250, 500, and 1000 watts.

The 250-watt lamp was made available in two bulbs, one having an inside aluminized reflecting surface making it particularly adaptable to experimental installations. The 500- and 1000-watt sizes have triangular-shaped filaments which give a higher concentration of radiant energy. One manufacturer announced a "sealed" drying lamp unit for the 500- and 1000-watt lamps, using a cover glass which passes a large percentage of the infrared energy but absorbs a considerable part of the visible light.

Due to the space limitations of this article, the lighting developments discussed above obviously constitute only a small proportion of the total number of developments, both of great and smaller magnitude, which have taken place within the period of the last two decades. All of them, however, represent forward steps in the science of illumination, a science that every year becomes more and more exact.

What the future holds we can only speculate. Lamp laboratories are continually striving for better quality and higher efficiency. Just where their search will lead tomorrow, we of today, who have seen such rapid advance during the past few years, hesitate to guess. But if the experience of the past serves as a fairly accurate measuring stick, we can expect the sources of the future to be high in efficiency, cool in operation, and low in cost. These characteristics will be Science's contribution to better living.

"Fetchin' Christmas In de Kitchen"

(Continued from page 30)

tised, "At last, a successful refrigerator."

A third manufacturer featured theirs in 1923, saying, "it earns big profits, both on its sales and its use of current . . . the current is figured at eight cents per kwh." This statement was followed by a table showing that utilities must sell 32 washing machines to get the power revenue equal to that from one of their refrigerators. The average refrigerator probably used 2.2 kwh per day.

In the South, refrigerators were proving that hot weather was not an impossible obstacle but, on the contrary, the long summers provided an active market.

VEPCO WINS NATIONAL SAFETY AWARD THREE TIMES IN SUCCESSION



1938



1939

WITH a record of 1.5 accidents per million manhours worked, employees of the Virginia Electric and Power Company have again been awarded first place — for the third time in succession — in the nationwide competition sponsored by the National Safety Council.

This record is not the result of any high-pressure Safety Campaign conducted within the organization, but the product of a united effort on the part of all employees who have made up their minds to work safely and to study and apply recognized Safety methods and practices in their daily work.



1940

The Utility business is by its very nature a hazardous one, requiring unusual care on the part of both men and foremen, and although employees of Vepco have made commendable progress in reducing their accident frequency over the past decade, they realize that there still is much room for improvement.

They have, accordingly, set for themselves during the year 1941 the goal of not only holding first place, but of bettering their last year's score of 1.5 accidents per million-hours worked.

VEPCO'S TEN-YEAR RECORD

YEAR	NO. MAN-HOURS	NO. OF ACCIDENTS	NO. OF EMPLOYEES	FREQUENCY	FINAL STANDING
1930-31	4,149,663	40	1,702	9.639	9th
1931-32	3,741,319	17	1,616	4.54	6th
1932-33	3,284,235	10	1,452	3.045	4th
1933-34	3,406,268	12	1,583	3.523	4th
1934-35	3,291,224	12	1,513	3.646	3rd
1935-36	3,565,749	11	1,571	3.085	2nd
1936-37	3,793,941	11	1,639	2.899	2nd
1937-38	4,172,495	10	1,876	2.397	1st
1938-39	3,997,997	5	1,803	1.251	1st
1939-40	3,945,582	6	1,840	1.521	1st

VIRGINIA ELECTRIC AND POWER CO.

With the average rate for electricity now used by refrigerators in the neighborhood of three cents per kwh and a six cubic foot refrigerator of 1941 quality using, say, 0.8 kwh per day with service calls for all makes and ages now in use, say, 0.5 per year, the remarkable advances made by household refrigerators are staggering. About 16,100,000 are estimated to be in use in the United States today. Even with 63% saturation, it's not difficult to see the job has only begun. Even as we have paused here to look back, the parade is moving on. Young families are beginning life. Older families are modernizing. We have better refrigerators of greater value at lower costs to offer. Let's keep moving according to our plan.

Planning the complete kitchen started in 1932. Work centers, known as the storage and preparation center, the cooking and serving center, the cleaning and dishwashing center, the utility storage center and the planning center developed. Standard dimensions for cabinets and work surfaces were established. A new approach to the whole problem was advanced. Leading manufacturers inaugurated kitchen planning services, and now, as the Forties get under way, progressive retail outlets all over the nation sell cabinets along with appliances. They lay out their own kitchen plans locally. It's a part of their sales responsibilities. Kitchen installation specialists are entering the field. More than ever is the industry dependent upon the contractor, the plumber, and the wire puller.

To high-spot this interesting subject is all that we've attempted here. To do it justice, years could be spent and volumes written. Some day someone will write a book about it.

One undeniable fact deserves emphasis. Throughout this appliance era, engineers have not only worked to make it easier to sell those appliances which had public acceptance, but they have shown they also like to develop new ones of real merit. Every year engineers will have newer and better models in mind and on paper, but sales people have to sell their way and the engineers' way to them. It's the sales job done this year that will make the next year's improved models a reality. So, as sales people go forward with the appliances of their choice, knowing that quality is up, with features and prices that satis-

fy, they should pat themselves on the back.

However, if you are a salesman, remember as you do it, that while you work to bring Christmas to your own kitchen and those of your customers, we engineers will be working to bring Christmas to ours. We'll face the unknown effects of a world conflict, along with all else the future holds, but we promise you we have plans for bigger and better Christmases in many, many kitchens. It's our faith in the American way and in you sales people that does it.

Progress in Wiring Practice and Design

(Continued from page 32)

There are other notable examples of definite progress which affects industry. Article 500 of the code is an example of this forward movement. In the 1920 code, there were a few general rules on hazardous locations. In the present issue of the code are extensive detailed rules which govern the installation of wiring and the construction of equipment which is acceptable in the various kinds of hazardous locations such as in the presence of explosive gases and vapors from gasoline and similar volatile liquids, grain and starch industries, and those that produce explosive dusts, and cotton manufacturing, and storage.

The years past contain records of disastrous fires and explosions in these hazardous locations that have caused the loss of many lives and has resulted in the destruction of millions of dollars worth of property and stocks.

The appearance of Article 500 in the code, and the enforcement of its provisions by inspection authorities, has brought about the design and manufacture of a mass of electrical equipment which is deemed safe for use in the presence of these explosive gases or dusts, and to a certain extent has revolutionized the installation of electrical equipment. Aside from the saving of life, the economies that have resulted from the saving of property from destruction has made this portion of the code an outstanding contribution to electrical progress.

We cannot think of wiring without including the wiring methods by which the electrical current is brought to the point where it can be used, and there has been a certain amount of progress in this re-

spect in the last twenty years. Some wiring methods in past use have been discarded from the code, but a number of new ones have been added and there are now some seventeen wiring methods or variations of wiring methods recognized within the covers of the code.

An outstanding element of electrical progress has been the electrical inspector, the code enforcing authority, and in no place has this progress been exemplified so clearly as it has in the southern portion of these United States. There were electrical inspectors in the South twenty years ago, but they were not numerous. There was no coordination between them, and most of those engaged in inspection work were unacquainted with the men doing similar work in neighboring cities.

Today there is an entirely different atmosphere. Some of the smallest municipalities have electrical inspectors. These men know each other and work together in their common causes. It may be fairly stated that in no place in the country is there a more wide awake, progressive group of men than the electrical inspectors of the South, and it is no small part that these men have taken in the electrical progress of the last twenty years.

What of the wiring of the future? Since the birth of electricity in its commercial use, each decade has brought about new uses undreamed of a decade before, and without question the years ahead will show even more progress than the twenty years that have just passed.

Trends in Electrical Wholesaling Business

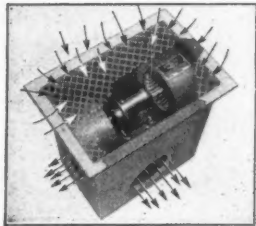
(Continued from page 30)

business in most of the lines now producing much of the sales volume. Some of today's popular devices will pass out of the picture, and what will make up for that lost business? Twenty years ago radio was in the experimental stage, but a couple of years later was helping many an electrical dealer—retail and wholesale—out of a somewhat sad predicament. Just a year or so ago, came fluorescent lighting—and look at it now! Who knows what's coming next? Whatever it is, the electrical wholesaler will be ready to take it up and promote it, and some youngster who doesn't suspect it today will be telling about it in the fortieth anniversary number of ELECTRICAL SOUTH!

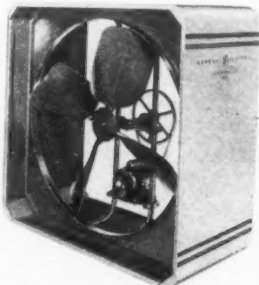
AIR CIRCULATING and cooling EQUIPMENT



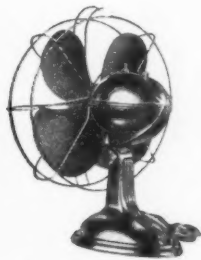
VICTOR New Revolaire by Victor Electric Products, Inc., Cincinnati, Ohio.



SKUTTLE'S Air Mover by Skuttle Sales Co., Detroit, Mich.



G.E. Home Cooling Units, by General Electric Co., Bridgeport, Conn.



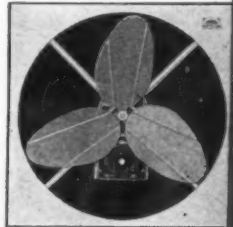
R. & M. BANNER Fans, by Robbins & Myers, Inc., Springfield, Ohio.



BUFFALO Breez-Air Cooling Fans, by Buffalo Forge Company, Buffalo, N. Y.



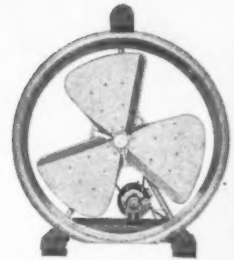
SIGNAL'S Deluxe Streamliner. Signal Electric Mfg. Co., Menominee, Mich.



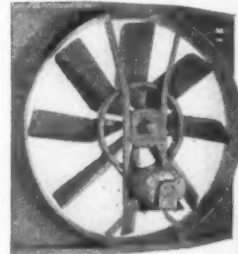
AUTOVENT'S COOLVENT Attic Fan by Autovent Fan & Blower Co., Chicago, Ill.

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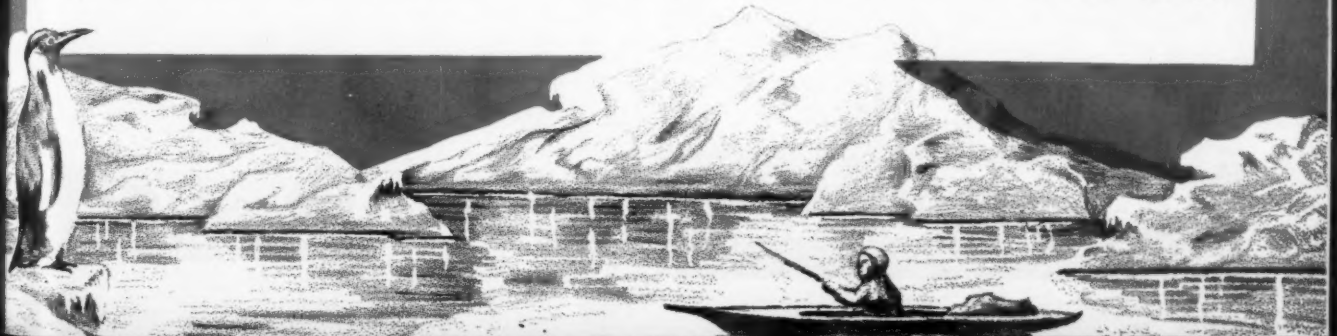
- American Coolair Corp.
- Autovent Fan & Blower Co.
- Buffalo Forge Co.
- General Electric Co.
- Hunter Fan & Ventilating Co., Inc.
- Robbins & Myers, Inc.
- Schwitzer-Cummins Co.
- Signal Electric Mfg. Co.
- Skuttle Sales Co.
- Victor Electric Products, Inc.



THE FRESH-AIR MAKER by Schwitzer-Cummins Co., Indianapolis, Ind.



COOLAIR Attic Fan by American Coolair Corp., Jacksonville, Fla.





**Take a Tip
... be Smart
See VICTOR
FIRST**

See what VICTOR has produced to make Fan history in 1941, in beauty, in value, in profits.

See the greatest little 8" price leader fan on the market. You'll sell 'em by the hundreds.

See the new 10" Vagabond with the new "fan flare" blades—new beauty at a popular price.

See the husky 12" Vanguard with more features at a lower price than any 12" fan you've seen yet.

See the Viceroy with the "Magimatic" shift. See the complete VICTOR Miracle Breeze Line and you'll know why we are telling you to SEE VICTOR before you choose your fan line.

SEE VICTOR

Important:

Your Jobber is ready to show you VICTOR Miracle Breeze Fans with full, complete details of this great new 1941 line. You will make money selling VICTOR in 1941. We mean it. Call your VICTOR Jobber now, or write us for his name.

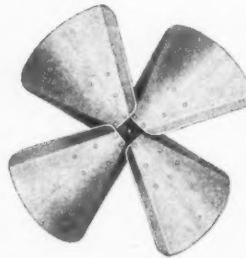
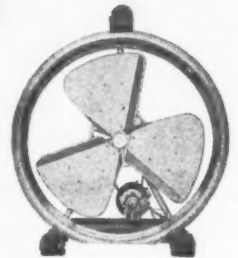


VICTOR ELECTRIC PRODUCTS, INC.
Dept. J- 3102 2950 Robertson Avenue
CINCINNATI, OHIO

**ASK YOUR JOBBER
Write today**

The FRESH-AIR MAKER

● Designed to give you a fast selling fan of high quality construction and fine appearance—Fresh-Air Makers are beautifully balanced, quiet and efficient in operation yet competitively priced—30", 36", 42", 48" diameters.



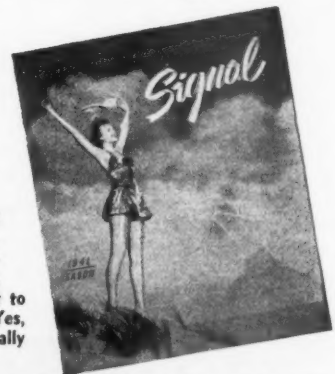
Or you can simplify your job if you build your own fans by the purchase of a proven, standard fan blade—individually packed—carefully balanced—three or four bladed type in 30", 36", 42", 48" diameters.

Write for further details and prices.

**BLOWER DIVISION
SCHWITZER-CUMMINS COMPANY
125 FAN STREET INDIANAPOLIS, U. S. A.**

**Send for your Copy
OF THE 1941 SIGNAL
FAN Catalog!**

There's a pleasant surprise for you in this 1941 SIGNAL Fan Catalog. It illustrates the most advanced line SIGNAL has ever produced — new streamlined desk fans, pedestal fans and 20" and 24" Air Circulators. Every one of these many new numbers is designed to please, built to last and priced to sell. Yes, siree, SIGNAL has really got something!



**SIGNAL ELECTRIC MFG. CO.
MENOMINEE, MICHIGAN**

Branch Offices:
W. E. Hopper
357-59 Marietta St., Atlanta, Ga.
Geo. E. Anderson
Santo Fe Bldg., Dallas, Texas



Announcing

R & M BANNER FANS

*The Price-Beauty-Quality
Sensation of 1941*

\$9.95

RETAIL
10-INCH OSCILLATING

An ultra-modern, sturdy, quiet, R & M quality fan—at an amazing price. To show it is to sell it!



The greatest new-business opportunity ever presented to fan dealers opens up with the arrival of the R & M *Banner* line. Never before have fans of such modern streamlined beauty, and such built-in R & M quality, been offered at such prices.

Think of it! A 12-inch, 2-speed oscillating *Banner* for \$17.95. A 10-inch oscillator (pictured) for \$9.95. An 8-inch beauty, non-oscillating, for \$3.95. And check the construction. Powerful oversize R & M motors; fully enclosed mechanism; precision-built gears and bearings; modern die-cast base, motor body, and enclosure; broad, quiet, vibration-free blades; stunning streamlined design and rich brown finish. . . . Watch these fans sell!

Check the *entire* R & M line now. Finer and more complete than ever, it meets *every need* of home, office, store, and factory. See your distributor at once—and write for new R & M Fan Catalog today.

Just Out!

**NEW R & M
FAN CATALOG**

Pictures and describes the complete R & M line—DeLuxe Fans, Heavy-Duty Commercial Fans, Air Circulators, Ceiling Fans, Portable Home Coolers, Attic and Exhaust Fans. A "must" for every fan dealer. Write for copy today.



ROBBINS & MYERS • Inc.

SPRINGFIELD, OHIO

FOUNDED 1878



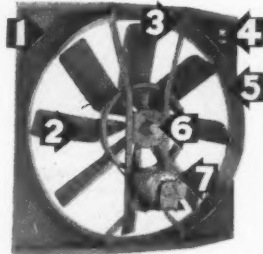
Your Attic Fan PROFITS Are Yours to KEEP!

when you sell this new, improved

Coolair
TRADE MARK
ATTIC FAN

Only Coolair Offers All These Features!

1. Welded Steel Frame
2. Eight Steel Blades
3. Sound Absorbing Springs
4. Certified Air Delivery
5. Streamlined Inlet
6. Oversize Ball Bearings
7. 1c per Hour Operation



Thousands of electrical appliance dealers, oilburner distributors and heating men have found that they can make attic fans pay them handsome summer profits. But they've also found that you've got to sell a quality fan . . . to make those profits stick in your pockets.

Coolair dealers have the jump on competition . . . their profits are theirs to keep . . . because they have no kickbacks and trouble calls from their customers to eat up those profits. More than 13 years of engineering leadership have built into the Coolair fan matchless quality and unequalled customer satisfaction.

Right now is the time to line up with Coolair and get set for big profits in the home-cooling field this summer. Write today for FREE illustrated literature and franchise information in your territory.

MAIL THIS COUPON TODAY!

American Coolair Corporation,
Jacksonville, Florida

Please send me information on the complete line of Coolair fans.

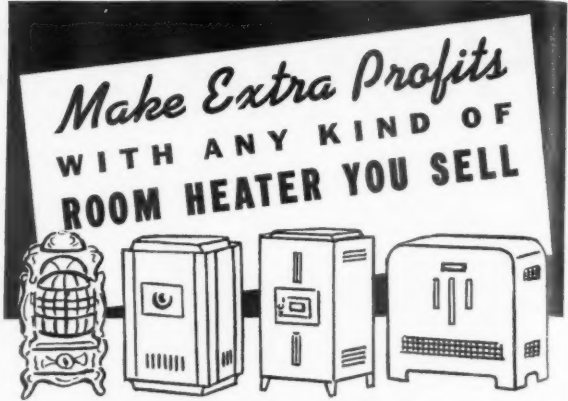
Name _____

Address _____

City _____ State _____



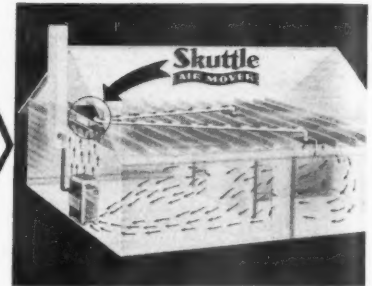
AMERICAN COOLAIR CORPORATION
Manufacturers . . . JACKSONVILLE, FLORIDA



. . . EVERY HOME OWNER WANTS TO HEAT EXTRA ROOMS WITH HIS PRESENT HEATER

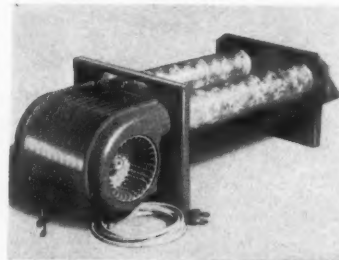
HERE'S HOW HE CAN DO IT!

FOR CIRCULATING HEAT IN THOSE COLD ROOMS



• People who use room heaters for heating find them efficient enough to take the chill off of their homes during the milder seasons, but this time of the year one heater will not heat more than one room. The Skuttle Air Mover, an entirely new principle of distributing heat, was designed to increase the heating efficiency of any room heater, whether it burns coal, wood, oil or gas. It gives any small or medium size home the big home luxury of circulated heat. Any home owner can install this Skuttle Air Mover himself. He merely inserts the unit in the attic directly over his space heater nothing but the register shows in the ceiling of the room, and then directs the ducts (6" insulated stove pipe) to the rooms he wishes to heat. It's as simple as that. Note the cross section view of house illustrating typical installation and how the heat is circulated back to the heater.

THIS VENTILATOR SELLS FOR \$15.00



Skuttle's improved Model 100 Ventilator comes complete ready for installation. It is ideal for kitchen, recreation rooms, auto trailers, small lunch rooms, etc. This ventilator is attractively priced and so well constructed it will be a profit leader for you. Our discounts will interest you. Write today for further information.

Build of the finest materials, equipped with twin sirrocco blowers, lead-out ducts, toggle bolts, rust proof lead-out ducts, 8 ft. of cord and plug and finished with nickel finished cover with choice of color combinations on housing. Delivers 180 c.f.m.'s.

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AIR MOVER



SKUTTLE Sales COMPANY
Air-Conditioning Equipment
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Life's Happiest Hour : : : : BY WEBSTER



Sell the Fans with the Popular Name—G-E— and Benefit from This Strong Promotion

Here's the big fan news for 1941! A new group of G-E Fans to sell at lower prices!

G-E Fans are 'way up there in sales every year. Because they're known through advertising. Because they're pushed by powerful promotion. Because the public accepts them as tops. Because they're the most

complete line of fans in America.

Now, with this new low-price group, G-E Fans will move faster than ever—bring you more profit than ever! Get the cheerful story from your G-E distributor salesman. Hitch up with the leader and go to town with G-E fans this summer!

Fan Sales Section, Appliance and Merchandise Department, General Electric Company, Bridgeport, Connecticut

YOU GET ALL THIS POWERFUL PROMOTION FREE!

1. A 10-color action *Window Display* that will stop 'em, hold 'em and sell 'em.
2. Handsome *Catalogs* crammed with facts and illustrations that build sales.
3. *Direct Mail Pieces* that "get in the door" of homes, stores, offices.
4. Local newspaper *Ad Mats* that help you sell when your market is "hot."
5. Powerful *National Newspaper Ads* in over 175 key cities—run when you need them—in local hot weather.



Twenty Years of Contracting Progress

(Continued from page 28)

creating a legitimate overhead which does not exist with most of them.

Relations with wholesalers have not changed materially. Most of the wholesalers always have and probably always will try to sell their material through the legitimate contractor, and most of the salesmen are doing a good job in spending a little more time with the contractor and his workmen in educating them in the uses of the new lines of materials.

Supply houses have been on the increase, as would be natural to expect, with the growth of the country and the industry. There seem to be about 25 per cent more supply houses. This naturally increases warehouse or distributor stocks, rendering a better service to the contractor. In our locality there would seem to be as much material sold through the independent jobbers to the contractors as through the "chain" jobbers.

However, it might be mentioned that wholesalers in this locality seem to be doing more direct selling to industrial plants and buildings where an electrical maintenance department is operated. Due to the changes in our local city ordinances in recent years, industrial plants and commercial buildings are permitted to do their own electrical work provided their men take an examination for their particular class of work.

We can expect great things from the new type fluorescent lighting system; and with the public becoming more light-conscious and the lighting load increasing every day in our commercial and industrial buildings, the use of the new small

diameter building wire has practically solved the rewiring problems which would have been encountered a few years ago. Fluorescent lighting and the new small-diameter wire will go far to increase the volume of the electrical contractor's business in future.

The average electrical contractor will naturally have an increase in his business due to the defense program, whether or not he has a direct contract with the government. The defense program has already affected our business materially although we have had no government contracts to date. There are several large government projects under construction in this area and there probably will be more in the near future. Apparently all contractors fortunate enough to receive this class of work are satisfied with the profit they make.

Although electrical contracting has its headaches and the other fellow's grass seems greener at times, still there is something fascinating about this business that has a tendency to hold you, especially if you have actually worked at the trade and really studied it along with your work.

I suppose the most fascinating work which we have done was theater work. While with a Dallas contractor, before entering business for myself, we did practically all the theater work in the city, as well as some in other cities. I carried on a greater portion of this work for some years, after organizing my own company.

Electricity has, and probably al-

ways will, play a major part in theater stage presentations. And, some of the most fascinating scenes would be inexpressive and colorless, without proper lighting. In some of the acts, as much as 50 kw is used for a single scene, all of which are operated by a very intricate system of controls known to the theater profession as a pre-selective, all-master remote control type switchboard; meaning that the switching control for an entire show can be set up beforehand, during rehearsal, after which it is only necessary to operate the proper all-master switches when signal for the respective acts are given.

Boards of this nature are generally equipped with an extended control feature, wherein it is possible to set up the entire switchboard for giving certain lighting effects on the stage, which can in turn be operated from the picture booth or any part of the theater with an ordinary light duty momentary contact switch, using only three wires. Sometimes these switches are actually set in the scenes where the actor can operate the lights from an ordinary wall switch by the door. Moving cloud effects, running water, fire, and many others are reproduced with the aid of machines, using a powerful light and a moving transparent screen propelled by a variable speed, motor driven, reduction gear drive. Thunder, wind effects, and many others are reproduced with special machines and operated from such boards.

However, if you want something that will keep you in high gear around 18 to 20 hours a day, with plenty of headaches, look for a contract to handle a big state fair. I believe the three years I put in as official electrical contractor for the State Fair of Texas, in Dallas from

All regular departments omitted from this issue will be resumed in the March 1941 issue.

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Ventilating equipment for commercial, industrial and public building application. Quiet and efficient.

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the proper method of making connections for a polarity test on a three-phase delta connected stator? How to lay out armature windings of the split-loop? The theory of operation and the many types of circuits utilized in capacitor-type split phase motors? Methods of reversing rotation of a-c and d-c motors? How to eliminate brush troubles? Select the best type of varnish?

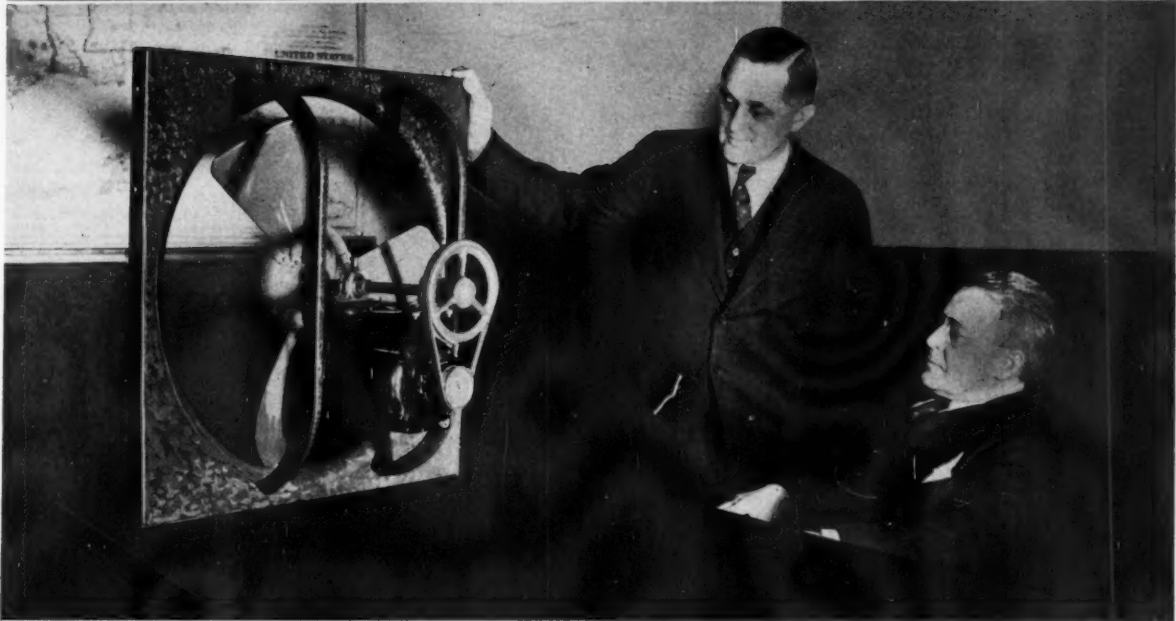
The answers to these and many other practical problems on motor repair will be found in Jack Beater's book

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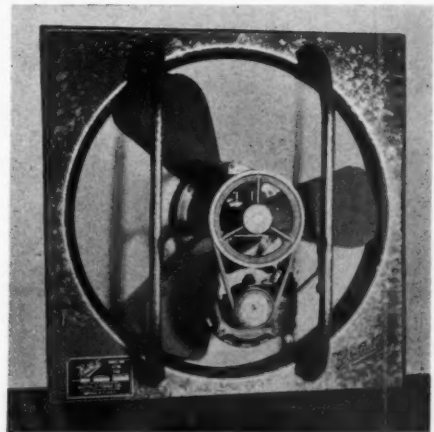
and paying dividends!

Yes, it's one of the smartest and best-selling ideas that ever hit the electrical field. Every home is a prospect for a "Buffalo" *Breez-Air* Cooling Fan. It solves the problem of summer cooling at low cost, and is recognized by air conditioning experts for its efficiency, quietness and all-round satisfaction.

"Buffalo" *Breez-Air* Fans are quality-built throughout . . . large capacity, quiet fans, designed for years of exacting service. Better write today for full details! There's a potential market waiting with quick profits.

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Branch Engineering Offices in Principal Cities
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"Buffalo" BREEZ-AIR FANS for Home Comfort Cooling

1930 to 1932, were responsible for much of my grey hair and a few of the lines in my face.

But I always look back on those years proudly because they were educational and were responsible for many of the friends, business associates and customers I now have. We did some house wiring in those days, but centered our activities mostly around commercial building and power wiring, trouble shooting and motor rewinding, repair work and machine work.

During the big Texas Centennial Celebration in 1936, which I dare say was the best electrical era any of us have seen around Dallas, we did wiring on a number of the buildings in the grounds. Among these were the Hall of Negro Life Building, The Magnolia Lounge, Humble Hall of Texas History, also the Coca-Cola Crystal Fountain exhibit, which was considered one of the most outstanding exhibits at the Fair, and many others.

Although our company has done fewer large jobs than some of the other well-known contractors, we try to make each job an outstanding electrical installation wherein neatness and exactness, even with a

little less profit, are more essential to us than shabby work, speed and bigger profits.

We are proud to list among our outstanding jobs the Electrified Water Building, General Electric Building, Guardian Life Building, of Dallas; the Women's Psychopathic Ward Building of a state institution at Terrell, Texas; the rewiring of the Lone Star Gas Building in Dallas; and recently, the rewiring of the Kress store in Dallas, and wiring of the new Highland Park Presbyterian Church.

Appliance Dealer Problems Discussed

(Continued from page 25)

a trade-in problem at any time.

What are the results of the factors which have entered the field in the past ten years? It should be emphasized, there is still business, plenty of it, to be had in the appliance field. All the appliances that are going to be sold have not been sold, not by many millions of units. But what effect has the past had on the way we will go after this business in the future?

To begin with, we have learned, as has every dealer who has stayed in business, that the word "profit" must not be overlooked. "Volume" was the catch-word of yesterday: "net profit" is perforce the keynote of today. All the mutations which have occurred in the business have been such as to increase the expense of doing business, which in turn means that the profit is that much harder to realize and must be guarded that much more carefully.

Trade-ins have presented one of the greatest threats to profit. In the old days, most sales were "straight deals," with no trade involved, and customers seemed accustomed to paying list prices. Maybe they learned from the automobile dealers how to bargain; anyway, they learned somewhere how to demand fantastic allowances for old units, and how to kick at list prices, and to demand discounts for this, that or the other reason.

Trade-ins too often mean trading real profits for paper sales. Whenever I hear a dealer's failing in business, I cannot help picturing his failure in terms of a store-room full of out-moded, unsalable used equipment that he has taken in on the sale of new merchandise. In that room lie the profits he thought he had, but didn't. In my opinion, careless appraisal of trade-in merchandise and a too-optimistic view of resale possibilities form one of the greatest evils besetting the business today.

Cost of operation and cost of sales is another factor which has changed. There are fewer prospects today, these are harder to sell, and there are more salesmen after them. This means nothing more or less than that more selling effort, and that means selling expense, has to go into every sale. This is adequately reflected in our own sales staff: in 1936, which was our peak year, our company had ten regular employees, working on appliance sales exclusively. Today our appliance operation, including sales, collection and credits, is entirely operated by three men. And this is the point: if our staff were doubled, our appliance business would not be materially increased, and profits would be knocked in the head. Think that over!

What that means is that the entire structure of doing business has had to be altered to meet the changing conditions. As far as sales employees specifically are concerned, it means that we now must have quality rather than quantity

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GREENLEE TOOL CO.
1707 Columbia Ave., Rockford, Ill.

in appliance salesmen.

Another rock past which many dealers have unsuccessfully tried to guide their boats in the past, and which must be watched carefully in the future, is gross margin. Most dealers try, at first anyway, to run on too narrow a margin of profit. This is an outgrowth principally of wide and cut-price competition. Two ways in which this margin can be dangerously narrowed down are by price-cutting on straight sales, and by over-allowance on trade-ins.

What many dealers overlook is the third factor, that by taking in trade-ins, through which they have already endangered their margin, they are automatically increasing their overhead. The same overhead is in operation on the sale and handling of repossessed and trade-in merchandise as is on new stock; often the overhead on distressed goods is higher than on new. Yet many dealers forget to take this into consideration. What it means is that they're trying to operate their business on an overhead allowance based on about 60% of their real business. I consider forty per cent the absolute minimum of safety in gross profit margins, and unless this margin is realized from traded goods as well as new, the overhead is in danger of getting out of control.

A twin ogre of the trade-in trap is the bad-risk bugaboo. And it's not a myth, either. A motto in our business has been "Let the dealer who just wants a big volume take the bad credit risks." And it has worked with us. Last year, from a gratifying volume, we had only four or five repossessions. Incidentally, I think it wise to let the finance companies handle the paper; too many dealers have gone broke trying to be their customers' bank.

To sum up, the appliance dealer's "Golden Age," I'm afraid, is a thing of the past. There has been a time in every southern city when, with rates going down and interest going up, the appliance field was like a gold rush and everyone was trying to stake his claim on the purchaser's electrical outlet.

We're all still trying to do that same thing today, naturally, but we needn't expect to strike the "mother lodes" of those years. The market hasn't been exhausted by a long shot, but there's not the great throng of new users to sell any more. The open field of prospects has narrowed down considerably.

The future? This isn't supposed

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BRIEGEL METHOD TOOL CO., Galva, Illinois

to be a book review, but I can think of no reference more apt than the lesson to be found in Margaret Mitchell's great book of the changes in the South, *Gone With The Wind*. Boiled down, that voluminous and entertaining work contained a lesson which was expressed in Scarlett O'Hara's philosophy of living: "The old days, good though they were, are gone forever. Let's don't worry about things that *were*; let's do what we can with things that *are*!" Those who can adjust themselves to the inevitable economic changes will survive and prosper; those who cannot will be winnowed out.

I can see no radical changes ahead in the field, neither another boom period nor any new and confounding problems to deter the business. At present, and in the future, good, sensible cautious business methods will take care of things in stride. We cannot—and certainly don't want to—overlook the obvious circulation of more money, increased income, due to national defense employment and spending, and to an independent business upswing. That plus, new and improved models in various appliances, plus current increases in home building, plus the flourishing of the marriage license bureaus, makes the future look comfortably bright.

What it boils down to is that the appliance business has come of age. It has passed through its period of phenomenal growth, the golden heyday of its youth, and has now matured, settling down into lines which are neither phlegmatic nor spectacular. Every major business has gone through the same evolution: the automobile business, the insurance business, the oil business . . . the photography business is going through it now. All were gold mines when they were new; all flourished, then floundered, and then found their niche. The electrical appliance industry is today finding its niche.

This is exemplified by the difference in sales personnel. Gone are the days when a dealer could put out a dozen untrained kids on canvass, and get a lot of sales from them, just because people wanted to buy appliances. Appliance selling has become a specialized branch of selling, separate and distinct, just as is car selling, security selling, insurance selling, or a dozen other specialized sales fields. This means that we'll hire less men, but that we'll have better men—we'll *have* to have good men! We'll keep them longer, and they'll make better

earnings.

There's still gold in the hills! Maybe it won't tumble out in nuggets as it used to, but there's still plenty of pay-dirt for the operator who will work carefully and painstakingly at panning it out.

The Utilities' Contribution

(Continued from page 23)

cent years, 90% of the nation's total electric power production is still provided from privately-owned plants. This same ratio applies to the South. With such preponderance of private ownership, it should be apparent that this rapid development of our power resources has been almost solely the contribution of private enterprise. Government never pioneers in any field; it only copies the development of others.

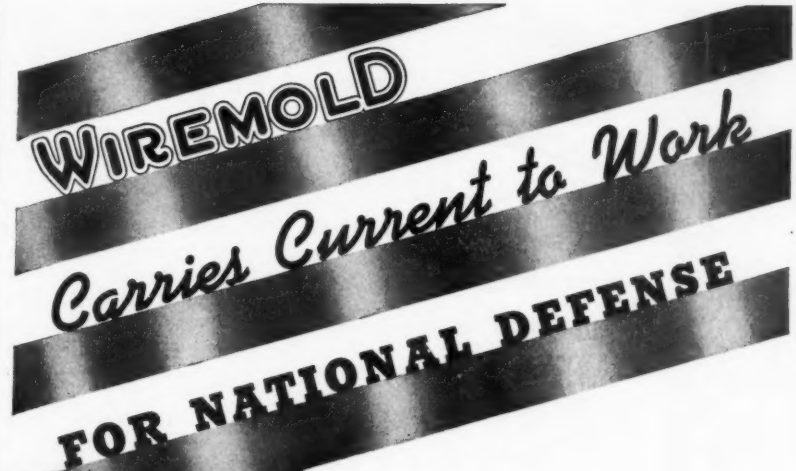
And now after twenty years of unprecedented power development, our nation is again faced with a national defense emergency. Individual enterprise and initiative is again equal to the task of providing the full power needs of the nation for defense purposes. The industrial development of America has been the marvel of our age; this industrial giant will continue as our greatest defense bulwark if unfettered by governmental competition and restraint.

The Electrification of Industrial Plants

(Continued from page 20)

the best interests of his industrial customer. Today an open wiring job is a freak and due to code changes, reduced prices, and new insulating materials, a good conduit job can be put in as cheap or cheaper than open wiring. Twenty years ago a twelve per cent voltage drop was good engineering. Today, due to reduced copper prices and improved skill in the art of wiring, a voltage drop greater than three per cent is taboo. The more recent development of Pyranol filled transformers and air cooled transformers has helped to solve problems of regulation and reduced wiring costs.

The simple rugged squirrel cage induction motor has come a long way in twenty years and has been a most important factor in the progress of industrial electrification. Twenty years ago, every manufacturer's motor was put up in a different kind of a package, no two dimensions alike. Today with



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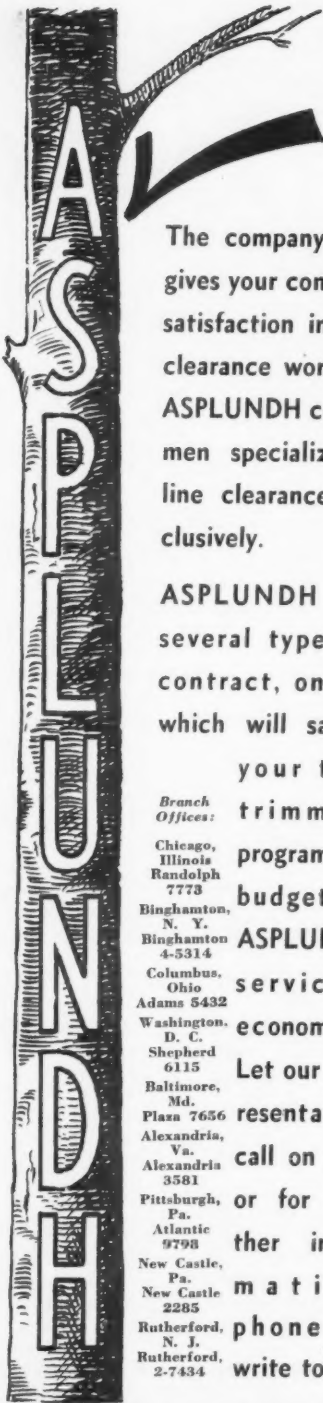
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Several types of so-called double squirrel cage rotors have been developed to meet varying starting load conditions, in many cases making the use of slipping motors unnecessary—or meeting the current inrush limitation of the central station without the added cost of an auto starter or compensator. Whoever thought twenty years ago that it would be standard practice to use an across-the-line, magnetic type, push-button switch to start a forty or a fifty horsepower motor. Thermal overload relays and under voltage time delay were unheard of. Who remembers the old dash pot type relays which never could be kept in calibration? When they weren't plugged up with lint, the help would steal the oil out of them to lubricate "ma's" sewing machine or the distributor on the flivver.

The electrical manufacturer has done a grand job in designing motors for a specific application—to do a special job—such as slow speed direct connected synchronous motors for compressor drives, totally enclosed loom motors, lint proof spinning frame motors, enclosed-ventilated motors for use in the presence of acid fumes, individual fractional horsepower motor operating seven thousand to eight thousand rpm for rayon spinning buckets, special motors for rigs on oil well pumping and hot oil in the refinery, sectional range drives for the paper industry, tenter frames in textile finishing plants, newspaper presses.

In the last few years, power factor correction has become of great importance. For industrial purposes the synchronous condenser with its limitations and its ten to twelve per cent losses has become practically obsolete, being replaced by the capacitor with only 1/3 of one per cent losses and at a price per kva as cheap or cheaper than the old synchronous condenser and,

in addition, permits installation at the point of load where correction is needed and helps to relieve overloaded feeder circuits.

It is hoped and believed that further development, research and progress will continue ad infinitum and the next twenty years will show a far greater progress toward an optimum of perfection than has been produced even in the last twenty years.

Rural Electrification In the Southern States

(Continued from page 17)

sulting in higher income for the producer. Producers of 500 or more bushels a year can have their own individual curing and storage houses and smaller producers can organize and operate a community house.

Electricity has made possible the development of quick freeze locker plants and freezer units for individual farms, providing facilities for handling small fruits, vegetables and meats to be marketed at a profit for the producer. These units are providing a better supply of food stuffs for home consumption which is resulting in better balanced family diets and improved health for rural people which is so greatly needed throughout the South.

Leaders' Impressions of Effects of Rural Electrification

The following are excerpts from letters received from men who have been closely connected with rural electrification development in the South.

Oscar W. Meier, agricultural advisor, REA: "It is rather hard to pick out one most outstanding development of electrical equipment or farm usage in the South. To me it seems that the bringing of electrical refrigeration to the farm homes of the South means more than any other one thing. I believe that when the majority of the farms in the South have an electrical refrigerator, we will be able to get them to produce and consume more milk, eggs and fresh meats. I have had a number of discussions with important officials of the Farm Security Administration and they stress the need of a very low-cost refrigerator for under-privileged and poorly fed farm people, especially children.

"If we can get the manufacturing industry to bring out an efficient

refrigerator which can be purchased for approximately \$50, Assistant Administrator R. W. Hudgens, of the Farm Security Administration, believes they can devise means for placing it in practically all farm homes of their clients which have electric service. He believes it will be as important as the pressure cooker, which I understand, has been placed in approximately 600,000 farm homes through the program of FSA."

E. C. Easter, manager, Rural and Towns Division, Alabama Power Company: "I think that the outstanding contribution that electric service has made to agriculture to date is the improvement of living conditions on the farm through the use of electrical equipment to make the farm home more attractive and more comfortable.

"From an economic standpoint, I think the greatest contribution of electric service to agriculture has been the use of refrigerating equipment in the farm home to reduce the cost of living, in the dairy to reduce the cost of operation and improve the quality of the milk, on the general farm for the preservation of perishable farm products allowed to waste without refrigeration, and for the operation of the farm community cold storage and locker systems for the convenience and use of the farmers generally throughout the state.

"There are many other satisfactory and profitable applications of electricity on the farms of this section, such as poultry house lighting, brooding, electrical equipment in the farm shop. While our experiences have been that general acceptance of those uses by the farmers is rather slow and requires an immense amount of education and promotional work, I am still of the opinion that they will contribute greatly to a more prosperous agriculture in the future."

C. J. Hurd, chief, Agricultural Engineering Development Division of the TVA: "The need for rural electricity is not only improvement of ways and means of increasing the farmer's income, but to do so with regard to its potential effect on soil conservation and the lives of farm people. Another need for rural electricity, and one that is not reflected in the kilowatt-hour meter, is to make farming and farm living sufficiently attractive to encourage boys and girls to remain on the farm and become the leaders

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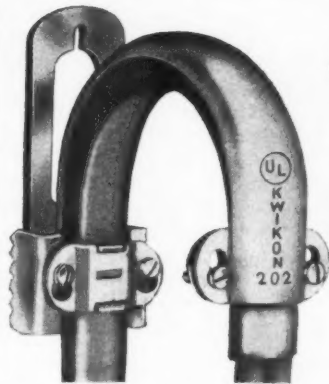
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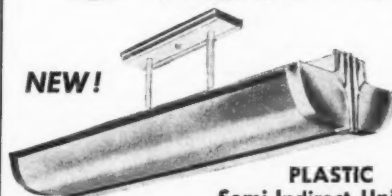
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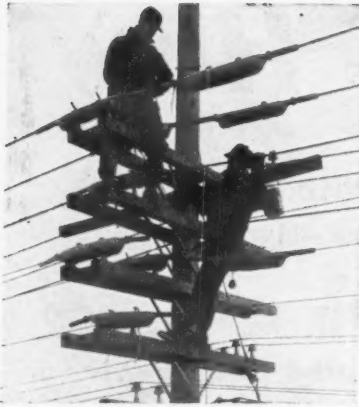
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Company.....
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ONE-PIECE
LINEMEN'S
SHIELDS**

of tomorrow.

"In the Tennessee Valley these two factors are very important. The basic resource — soil — has been tapped to the extent of over 6,000,000 acres in the present cropping program in an effort to keep up the level of farm income. This soil, depleted and stripped of good productivity for many years to come, represents nearly 30 per cent of the crop land now available in the Tennessee Valley. During the decade 1920-1930 over 60 per cent of the national migration from farms to cities, or over 3,500,000 people, came from the South. Electricity as a tool in the home and on the farm can help change this situation!"

David S. Weaver, extension agricultural engineer for the state of North Carolina: "The North Carolina General Assembly has never enacted a measure which has done more to bring joy and happiness to our rural people than it did when it set up the North Carolina Rural Electrification Authority.' This was a statement from a very prominent member of at least four previous sessions of the General Assembly—he was elected again to the 1941 assembly. 'For the dollar expended, the North Carolina Rural Electrification Authority has produced more tangible results than any commission ever set up by the Legislature.' This was from another member of the 1935 and 1939 General Assembly. Our former leader of Home Demonstration Work in the State has made the statement many times that rural electrification has done as much to improve the homes of North Carolina as all other agencies combined, considering the short length of time the program has been in effect.

"Expressions from home demonstration club leaders repeatedly reveal the influence for better social and cultural conditions in the rural homes as brought about or inaugurated by the coming of electricity. Our home management specialist reports tremendously increased interest in the condition of interior walls and floors in areas recently served with electric current. One jumps to the conclusion that electricity has revealed defects which were not so apparent in the days of gloomy interiors. While no figures are available, it has been observed that communities securing electric service seem to spring into life after quiet acceptance of con-

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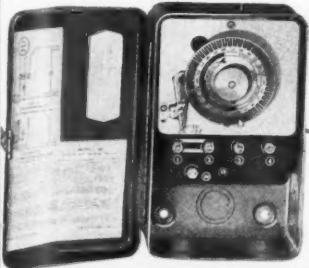
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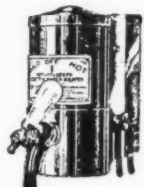
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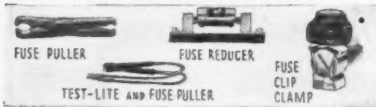
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THE BETTER PENCIL
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ditions as they were. Houses are being painted, flower beds planted, drives, walks, and lawns improved, and general community betterment is apparent. One cannot give credit to rural electrification for all of this, but with the coming of electricity people begin to realize that they are somebody, that they are enjoying some of the better things which science and technology long ago brought to their urban cousins; they take an interest in other things affecting their economic and social existence.

"As to the most outstanding development of electrical equipment or farm usage, I believe more actual good comes from the radio as one of the methods by which electricity can be used in the farm home than any other single one, not excepting the water pump or the efficient lighting system. I am so firmly convinced that radio has such a broadening effect that it will be looked upon as one of the great monuments along the path of educational progress in the United States. Referring to more tangible benefits of electricity, I believe that the introduction of the automatic electric water system and the electric refrigerator share in the honor of being first in the list of equipment bringing electrical blessings into the home. From the standpoint of farm production, dairy refrigeration and the brooding of chicks easily lead the list in this State."

**Social Gains Will Come With
Rural Electrification**

Innumerable examples could be given to show how electricity has inspired and provided farm people with the tools to make their farms better, increase their income, and to become better citizens. I am sure, however, that the readers of this magazine are well aware of the contribution that electricity is making in their rural areas to improve the economic and social status of their people.

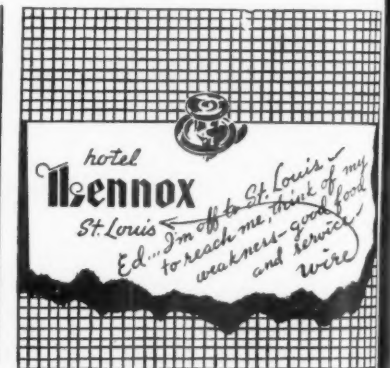
Rural electrification together with good roads and the automobile has been an important factor in the trend of population and the decentralization of industrial population into rural areas. This trend will in all probability be accelerated as electric service becomes more generally available. The social significance of this movement is difficult to gauge but is certain to have a most beneficial effect on our southern economy.

The developments which have

taken place, especially during the last decade, give an indication of what lies ahead. With over 80% of southern farms still without service there is much yet to be accomplished. Electric service in the next few years will be taken to an increasing number of the smaller farms of the South, as machines and applications are developed which meet the needs of small farmers. This will keep them from being driven off the land and result in genuine social gain for the entire region. With the coming of electricity, small southern farmers may look ahead with renewed hope. Rural electrification will bring to the farm home and the rural community "a zestfulness and design for gracious living which has long been a traditional hope of southern leaders."

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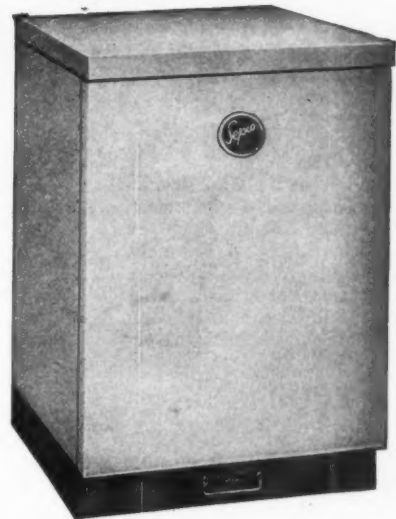
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Main Offices, Pine Bluff, Arkansas

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